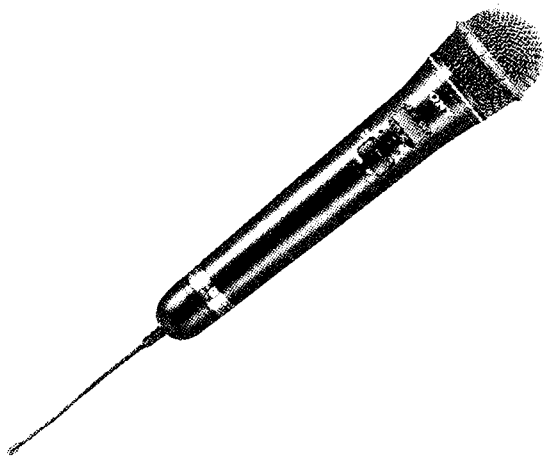
SONY

UHF SYNTHESIZED WIRELESS MICROPHONE

WRT-810A

SERVICE MANUAL

US Model



SECTION 1
OPERATION

Notice for customers in the U.S.A.
Use of Sony wireless devices is regulated by the Federal Communications Commission as described in Part 74 subpart H of the FCC regulations and users authorized thereby are required to obtain an appropriate license.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

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1-1. SPECIFICATIONS

Transmitter and Modulator Section

Oscillator	Crystal controlled PLL synthesizer
Carrier frequencies	94 settings at 125-kHz intervals WRT-810A (64): 770.125 to 781.875 MHz WRT-810A (66): 782.125 to 793.875 MHz WRT-810A (68): 794.125 to 805.875 MHz
Tone signal	32.768 kHz
Type of emission	110KF3E
RF power output	10 mW/2.5 mW, selectable (50 ohms)
Frequency stability	Within ±0.005%
Spurious radiation	Less than 2.5 µW
Type of antenna	1/4 wavelength wire
Pre-emphasis	50 µs
Reference deviation	±5 kHz
Maximum deviation	±40 kHz
Maximum modulation frequency	15 kHz
Frequency response	100 Hz to 13 kHz
Signal-to-noise ratio	More than 60 dB (A-weighted, with reference deviation at WRR-820A/840A)
Audio distortion	Less than 1.5% (with reference deviation)
Audio attenuator	0 to 21 dB, variable in 3-dB steps
Maximum input sound pressure level	(21 dB attenuation) 151 dB SPL
Microphone unit	Uni-directional dynamic type

Power Section

Power requirements	3 V DC (two L40 (LR6) alkaline batteries)
Battery life	About 8 hours at 25°C or 77°F (with Sony AM3 (LR6) alkaline batteries)
Current consumption	Less than 170 mA (at 3 V)

General

Operating temperature	0 °C to 50 °C (32 °F to 122 °F)
Storage temperature	− 30 °C to +60 °C (− 22 °F to +140 °F)
Dimensions	48 × 238 mm (maximum dia./length) ($1^{15}/_{16} \times 9^{3}/_{8}$ inches)
Weight	About 300 g (including batteries) (10.5 oz)
Accessories supplied	Microphone holder (1) Stand adaptor PF 1/2 to NS 5/8 (1)

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1-2. OVERVIEW

The WRT-810A is transmitter for an 800 MHz band UHF synthesized wireless microphone system to be used for broadcast or movie production purposes. The other system components include the AN-820A UHF antenna, the WD-820A UHF antenna divider, and the WRR-820A/840A UHF synthesized diversity tuner.

The microphone and tuners are classified by frequency band. See the table on the next page.
A 12 MHz frequency band (or two consecutive-numbered TV channels) is assigned to each microphone and tuner model. To indicate the assigned frequency bands, the parenthesized numbers following the model names in the table show the smaller of the assigned TV channel numbers. In building up a UHF wireless microphone system, be sure to combine a microphone and a tuner having the same TV channel number.

Frequency band		Model name			
TV channel	Frequency (MHz)				
64	770.125 — 775.875	WRT-810A(64)	AN-820A	WD-820A	WRR-820A(64)
65	776.125 — 781.875	WRT-820A(64)			WRR-840A(64)
66	782.125 — 787.875	WRT-810A(66)			WRR-820A(66)
67	788.125 — 793.875	WRT-820A(66)			WRR-840A(66)
68	794.125 — 799.875	WRT-810A(68)			WRR-820A(68)
69	800.125 — 805.875	WRT-820A(68)			WRR-840A(68)

Features

Easy selection of 94 channels
With its sophisticated phase locked loop (PLL) circuit, the unit can operate on any one of 94 carrier frequencies in a 12 MHz frequency band for each model, selected by a simple button operation.
Each channel is identified by a number consisting of a 2-digit TV channel number and a 2-digit wireless microphone channel number (example: 68-23).
See "Channels and Carrier Frequencies" on page 1-6 for more details.

Operation powered by widely available batteries
The built-in DC-DC converter allows stable operation, for up to eight hours continuously, with just two L40 (LR6) alkaline batteries.

CPU and LCD for coordinated operation control
The built-in CPU controls the unit operation including the PLL circuit function. The LCD shows the current channel number, the residual battery power, the input attenuation setting, the AF input level and the RF output.

Saved channel and input attenuation settings
The unit stores the channel and the input attenuation settings when it is turned off. The saved settings are retained even if the batteries are removed. Therefore, when using the unit next time, you need not make the same settings again.

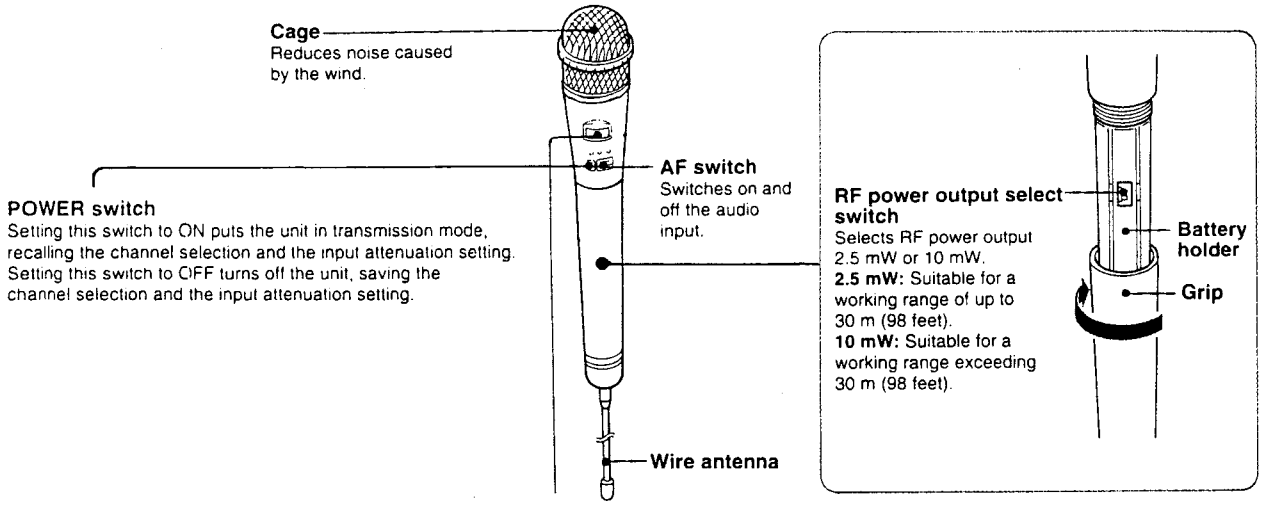
Highly reliable electronic attenuator
The built-in input level attenuator is adjustable in the range of 0 to 21 dB in 3 dB steps. It reduces signal distortion when an excessively strong input signal is received.

Handy audio input switch
You can use the AF switch of the microphone as a handy audio including input ON/OFF switch.

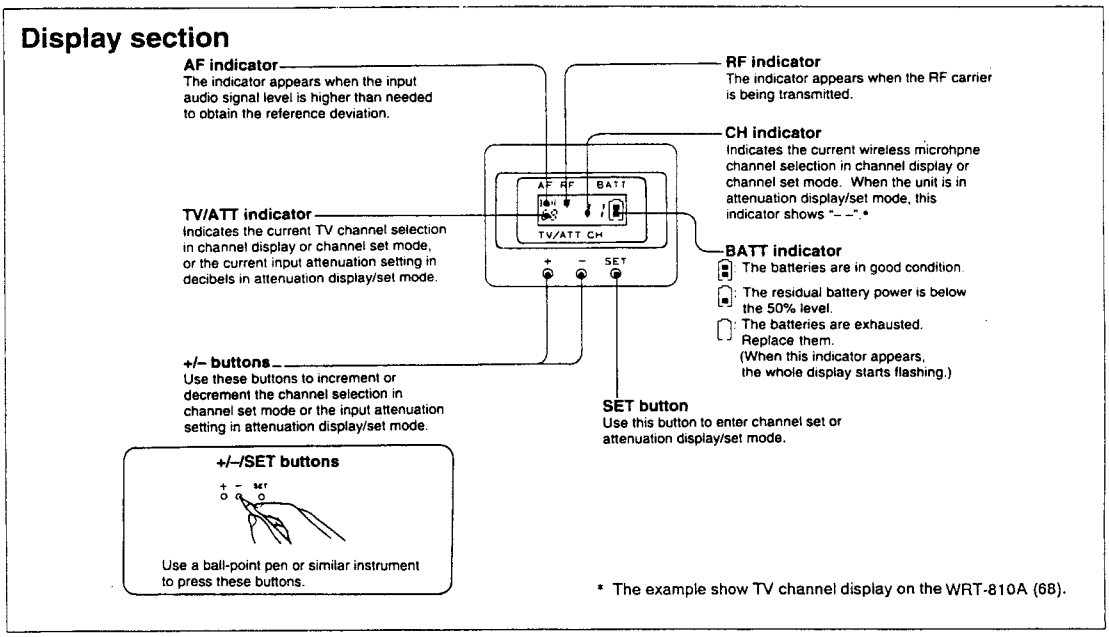
RF carrier with tone signal
The unit transmits the RF carrier accompanied by a tone signal, enabling the tuner with a tone squelch circuit to take out only the target audio signal received.

Wide dynamic range and low noise
The compander (compressor/expander) system enables transmission over a wide dynamic range with minimum noise.

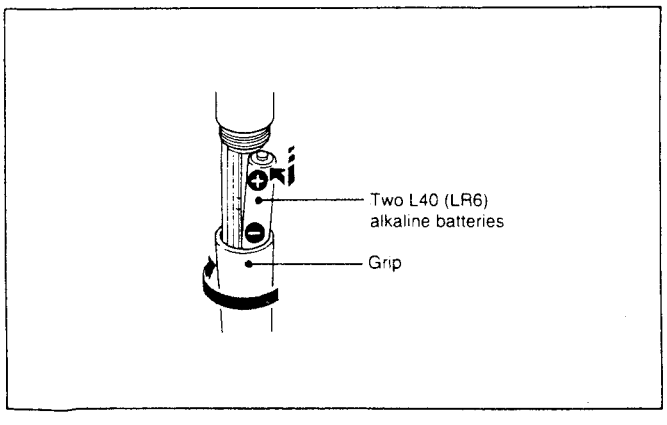
1-3. PARTS IDENTIFICATION


Cage
Reduces noise caused by the wind.
POWER switch
Setting this switch to ON puts the unit in transmission mode, recalling the channel selection and the input attenuation setting. Setting this switch to OFF turns off the unit, saving the channel selection and the input attenuation setting.
AF switch
Switches on and off the audio input.
Wire antenna
RF power output select switch
Selects RF power output 2.5 mW or 10 mW.
2.5 mW: Suitable for a working range of up to 30 m (98 feet).
10 mW: Suitable for a working range exceeding 30 m (98 feet).
Battery holder
Grip

Display section


AF indicator
The indicator appears when the input audio signal level is higher than needed to obtain the reference deviation.
RF indicator
The indicator appears when the RF carrier is being transmitted.
CH indicator
Indicates the current wireless microhpne channel selection in channel display or channel set mode. When the unit is in attenuation display/set mode, this indicator shows "– –".*
TV/ATT indicator
Indicates the current TV channel selection in channel display or channel set mode, or the current input attenuation setting in decibels in attenuation display/set mode.
BATT indicator
: The batteries are in good condition.
: The residual battery power is below the 50% level.
: The batteries are exhausted. Replace them. (When this indicator appears, the whole display starts flashing.)
+/– buttons
Use these buttons to increment or decrement the channel selection in channel set mode or the input attenuation setting in attenuation display/set mode.
SET button
Use this button to enter channel set or attenuation display/set mode.
+/–/SET buttons
Use a ball-point pen or similar instrument to press these buttons.
* The example show TV channel display on the WRT-810A (68).

1-4. INSERTING BATTERIES



Notes

- Be sure to turn the POWER switch off before replacing the batteries.
- When the unit is turned on with batteries which are exhausted, the BATT indicator displayed may reflect their temporarily recovered power which will reduce very quickly. Before starting extended operation, replace the batteries in the unit even if the BATT indicator shows [▯] or [▯]

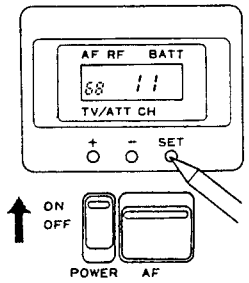
Notes on batteries

- Be sure to insert the batteries with the correct polarity.
- Do not pair different types of battery.
- Always replace the two batteries together.
- The batteries are not rechargeable.
- When keeping the unit out of use for extended periods of time, remove the batteries to avoid leakage.
- Should the batteries be found to have leaked in the unit, replace them with new ones after carefully wiping the leakage from the battery holder or case.

1-5. CHANGING THE CHANNEL SELECTION

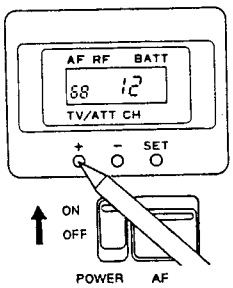
1 While pressing the SET button, set the POWER switch to ON to enter channel set mode.

The current channel selection will appear on the display.



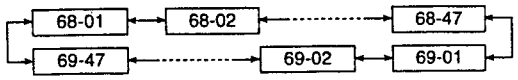
The example show TV channel display on the WRT-810A (68).

2 Press the + button to increment the current channel selection or the – button to decrement it.



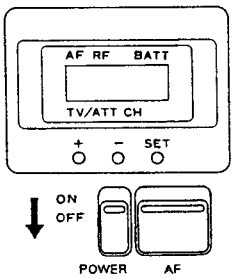
If you keep either button pressed, the channel selection will be incremented or decremented successively.

The setting will cycle the channel number from 68-01 through 69-47.



The example show TV channel display on the WRT-810A (68).

3 Set the POWER switch to OFF to save the selected channel number along with the current input attenuation setting.



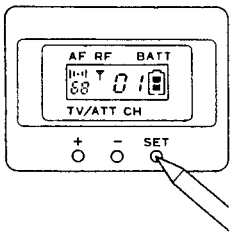
Notes

- The unit cannot transmit in channel set mode.
- Make sure that the channel selected is the same as that selected on the WRR-820A/840A unit used in the same system.
- Depending on the noise or interference conditions, the selectable channels may not necessarily all be usable. If necessary, you can determine the usable channels by stepping the channel selection through a number of channels on the tuner with the transmitter set to OFF. Those channels on which the RF indicator of the tuner does not light are usable.
- If there is a TV broadcasting station nearby, to avoid possible interference with broadcasing, do not use that station's channel.
- The unit may not operate correctly if it is turned on again immediately after turning off the power while in channel set mode. Pause for a few seconds or more before turning on the power again.

1-6. CHANGING THE INPUT ATTENUATION SETTING

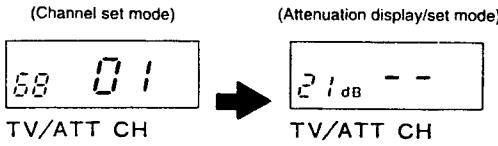
You can change the input attenuation setting in 3-dB steps in the range of 0 to 21 dB.
Raise the setting to decrease the sound volume or lower it to increase the sound volume, using the following procedure:

1 When the current channel selection is displayed (that is, when the unit is in either channel set mode or channel display mode), press the SET button to enter attenuation display/set mode.

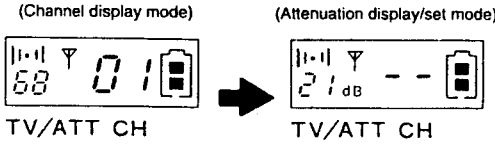


The current input attenuation setting in decibels will appear on the display.

- Switching from channel set mode to attenuation display/set mode

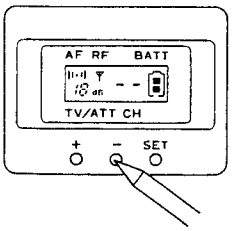


- Switching from channel display mode to attenuation display/set mode



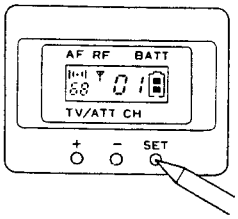
The example shows TV channel display on the WRT-810A (68).

2 Use the + and – buttons to adjust the attenuation setting.

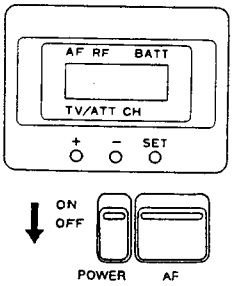


If you keep either button pressed, the input attenuation setting will be incremented or decremented successively until it reaches 0 or 21 dB.

3 Press the SET button to return to the previous mode.



To save the input attenuation setting along with the channel number selected in the preceding channel set mode:
Set the POWER switch to OFF.



The example shows TV channel display on the WRT-810A(68).

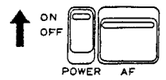
Notes

- After entering attenuation display/set mode by pressing the SET button in channel set mode, if you do not press any button for about five seconds, the unit will return to channel set mode automatically.
- The attenuation display/set mode entered by pressing the SET button in channel display mode will stay until you press the SET button again. If you turn off the unit without returning to channel display mode, the unit saves the status, so that it will enter attenuation display/set mode when turned on next time.
- Even if you keep on pressing the + or – button, the input attenuation setting does not cycle. After being decremented to 0 dB or incremented to 21 dB, the setting stays unchanged unless you change it in the reverse direction.

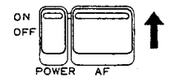
1-7. USING THE TRANSMITTER

1 Select the channel to be used.
(Use the procedure in "Changing the Channel Selection" on page 4.)

2 Set the POWER switch to ON.



3 Set the AF switch to ON.



Notes

- To prevent noise generation, keep the microphones and transmitters at least 3 m (10 feet) away from the antennas when the system is operated using a group which allows selection of up to 11 channels, and at least 6 m (20 feet) away when using a group which allows selection of 12 to 19 channels.
- Ensure that the tuners set to channels not being used are either turned off or set to the minimum output level (the LEVEL adjustment knob set to MIN).
- Turning the microphone on or off may generate some noise. To minimize the impact of such noise, set the LEVEL adjustment knob of the tuner being used to MIN beforehand.
- Switching the unit on without checking the channel selection first may interfere with the operation of other microphones/transmitters, if the current setting is already being used.

1-8. CHANNELS AND CARRIER FREQUENCIES

WRT-810A (64)

Channel	Frequency (MHz) TV-64 Band	Channel	Frequency (MHz) TV-64 Band
64-01	770.125	64-28	773.500
64-02	770.250	64-29	773.625
64-03	770.375	64-30	773.750
64-04	770.500	64-31	773.875
64-05	770.625	64-32	774.000
64-06	770.750	64-33	774.125
64-07	770.875	64-34	774.250
64-08	771.000	64-35	774.375
64-09	771.125	64-36	774.500
64-10	771.250	64-37	774.625
64-11	771.375	64-38	774.750
64-12	771.500	64-39	774.875
64-13	771.625	64-40	775.000
64-14	771.750	64-41	775.125
64-15	771.875	64-42	775.250
64-16	772.000	64-43	775.375
64-17	772.125	64-44	775.500
64-18	772.250	64-45	775.625
64-19	772.375	64-46	775.750
64-20	772.500	64-47	775.875
64-21	772.625		
64-22	772.750		
64-23	772.875		
64-24	773.000		
64-25	773.125		
64-26	773.250		
64-27	773.375		

WRT-810A (65)

Channel	Frequency (MHz) TV-65 Band	Channel	Frequency (MHz) TV-65 Band
65-01	776.125	65-28	779.500
65-02	776.250	65-29	779.625
65-03	776.375	65-30	779.750
65-04	776.500	65-31	779.875
65-05	776.625	65-32	780.000
65-06	776.750	65-33	780.125
65-07	776.875	65-34	780.250
65-08	777.000	65-35	780.375
65-09	777.125	65-36	780.500
65-10	777.250	65-37	780.625
65-11	777.375	65-38	780.750
65-12	777.500	65-39	780.875
65-13	777.625	65-40	781.000
65-14	777.750	65-41	781.125
65-15	777.875	65-42	781.250
65-16	778.000	65-43	781.375
65-17	778.125	65-44	781.500
65-18	778.250	65-45	781.625
65-19	778.375	65-46	781.750
65-20	778.500	65-47	781.875
65-21	778.625		
65-22	778.750		
65-23	778.875		
65-24	779.000		
65-25	779.125		
65-26	779.250		
65-27	779.375		

WRT-810A (66)

Channel	Frequency (MHz) TV-66 Band	Channel	Frequency (MHz) TV-66 Band
66-01	782.125	66-28	785.500
66-02	782.250	66-29	785.625
66-03	782.375	66-30	785.750
66-04	782.500	66-31	785.875
66-05	782.625	66-32	786.000
66-06	782.750	66-33	786.125
66-07	782.875	66-34	786.250
66-08	783.000	66-35	786.375
66-09	783.125	66-36	786.500
66-10	783.250	66-37	786.625
66-11	783.375	66-38	786.750
66-12	783.500	66-39	786.875
66-13	783.625	66-40	787.000
66-14	783.750	66-41	787.125
66-15	783.875	66-42	787.250
66-16	784.000	66-43	787.375
66-17	784.125	66-44	787.500
66-18	784.250	66-45	787.625
66-19	784.375	66-46	787.750
66-20	784.500	66-47	787.875
66-21	784.625		
66-22	784.750		
66-23	784.875		
66-24	785.000		
66-25	785.125		
66-26	785.250		
66-27	785.375		

WRT-810A (67)

Channel	Frequency (MHz) TV-67 Band	Channel	Frequency (MHz) TV-67 Band
67-01	788.125	67-28	791.500
67-02	788.250	67-29	791.625
67-03	788.375	67-30	791.750
67-04	788.500	67-31	791.875
67-05	788.625	67-32	792.000
67-06	788.750	67-33	792.125
67-07	788.875	67-34	792.250
67-08	789.000	67-35	792.375
67-09	789.125	67-36	792.500
67-10	789.250	67-37	792.625
67-11	789.375	67-38	792.750
67-12	789.500	67-39	792.875
67-13	789.625	67-40	793.000
67-14	789.750	67-41	793.125
67-15	789.875	67-42	793.250
67-16	790.000	67-43	793.375
67-17	790.125	67-44	793.500
67-18	790.250	67-45	793.625
67-19	790.375	67-46	793.750
67-20	790.500	67-47	793.875
67-21	790.625		
67-22	790.750		
67-23	790.875		
67-24	791.000		
67-25	791.125		
67-26	791.250		
67-27	791.375		

WRT-810A (68)

Channel	Frequency (MHz) TV-68 Band	Channel	Frequency (MHz) TV-68 Band
68-01	794.125	68-28	797.500
68-02	794.250	68-29	797.625
68-03	794.375	68-30	797.750
68-04	794.500	68-31	797.875
68-05	794.625	68-32	798.000
68-06	794.750	68-33	798.125
68-07	794.875	68-34	798.250
68-08	795.000	68-35	798.375
68-09	795.125	68-36	798.500
68-10	795.250	68-37	798.625
68-11	795.375	68-38	798.750
68-12	795.500	68-39	798.875
68-13	795.625	68-40	799.000
68-14	795.750	68-41	799.125
68-15	795.875	68-42	799.250
68-16	796.000	68-43	799.375
68-17	796.125	68-44	799.500
68-18	796.250	68-45	799.625
68-19	796.375	68-46	799.750
68-20	796.500	68-47	799.875
68-21	796.625		
68-22	796.750		
68-23	796.875		
68-24	797.000		
68-25	797.125		
68-26	797.250		
68-27	797.375		

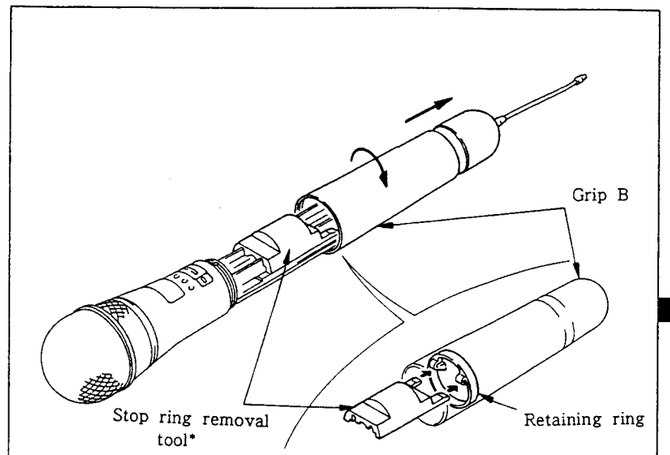
WRT-810A (69)

Channel	Frequency (MHz) TV-69 Band	Channel	Frequency (MHz) TV-69 Band
69-01	800.125	69-28	803.500
69-02	800.250	69-29	803.625
69-03	800.375	69-30	803.750
69-04	800.500	69-31	803.875
69-05	800.625	69-32	804.000
69-06	800.750	69-33	804.125
69-07	800.875	69-34	804.250
69-08	801.000	69-35	804.375
69-09	801.125	69-36	804.500
69-10	801.250	69-37	804.625
69-11	801.375	69-38	804.750
69-12	801.500	69-39	804.875
69-13	801.625	69-40	805.000
69-14	801.750	69-41	805.125
69-15	801.875	69-42	805.250
69-16	802.000	69-43	805.375
69-17	802.125	69-44	805.500
69-18	802.250	69-45	805.625
69-19	802.375	69-46	805.750
69-20	802.500	69-47	805.875
69-21	802.625		
69-22	802.750		
69-23	802.875		
69-24	803.000		
69-25	803.125		
69-26	803.250		
69-27	803.375		

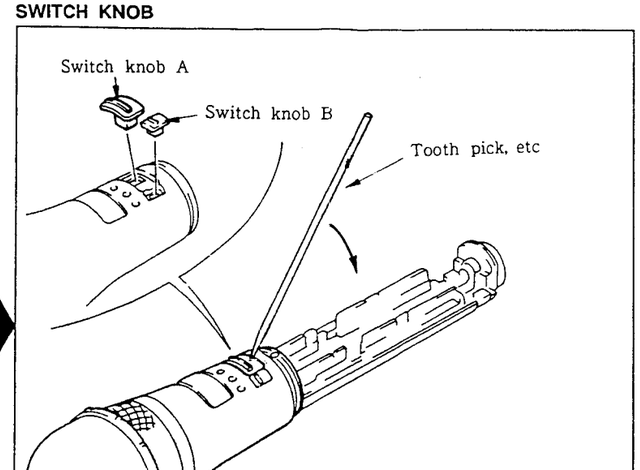
SECTION 2
SERVICE INFORMATION

2-1. DEASSEMBLY

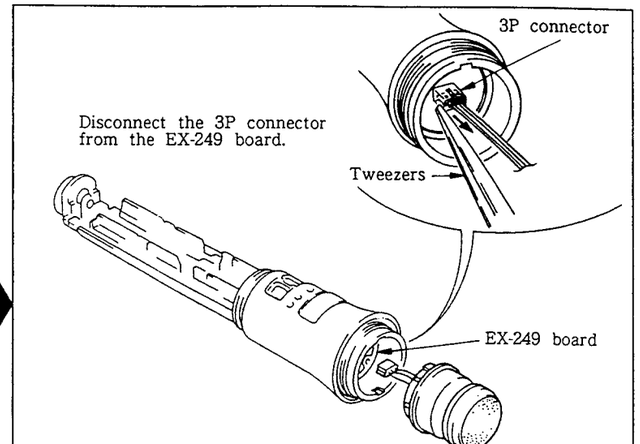
GRIP B


Grip B
Stop ring removal tool*
Retaining ring
• Push the hooks on the retaining ring with the stop ring removal tool* and remove grip B.
* Stop ring removal tool : part no. J-6224-470-A

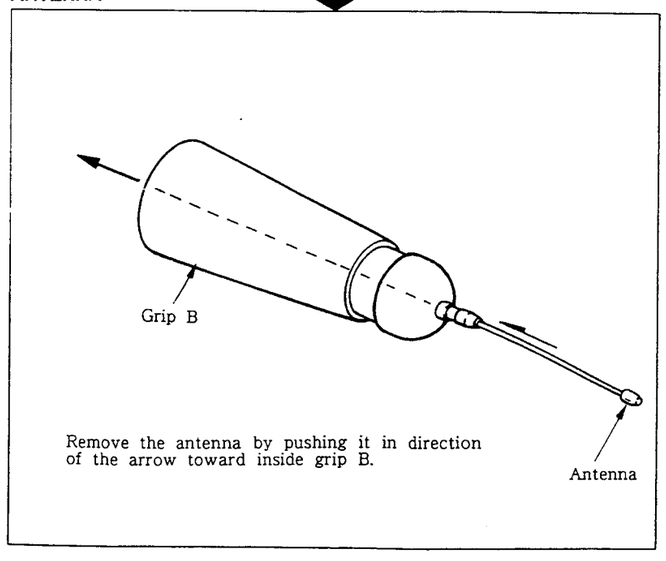
SWITCH KNOB



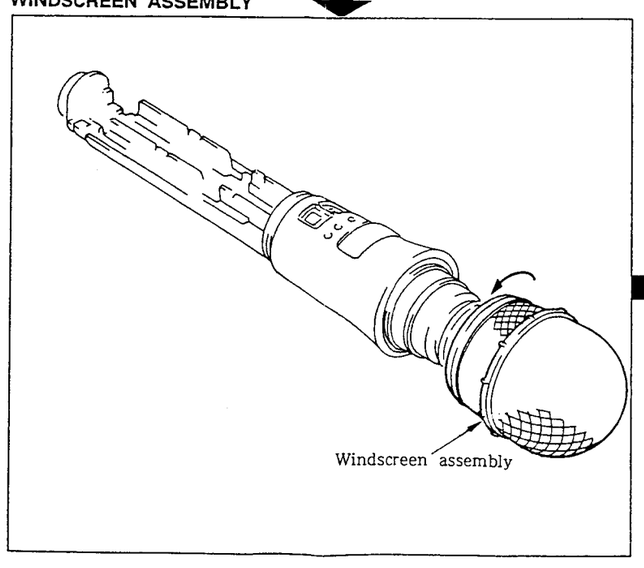
DM UNIT ASSEMBLY



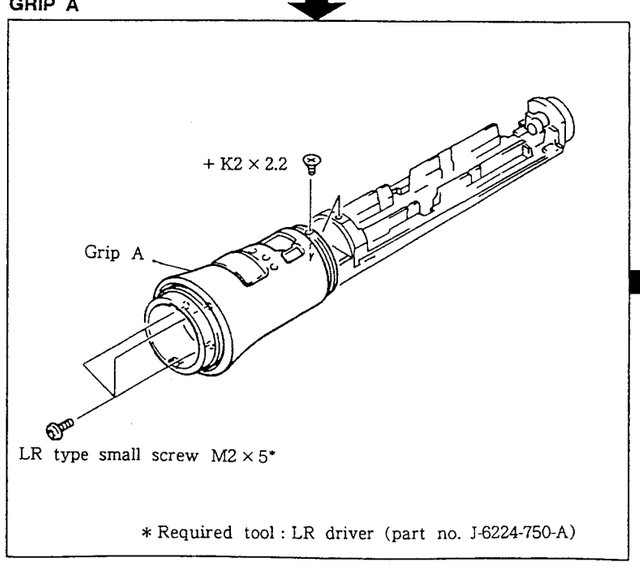
ANTENNA



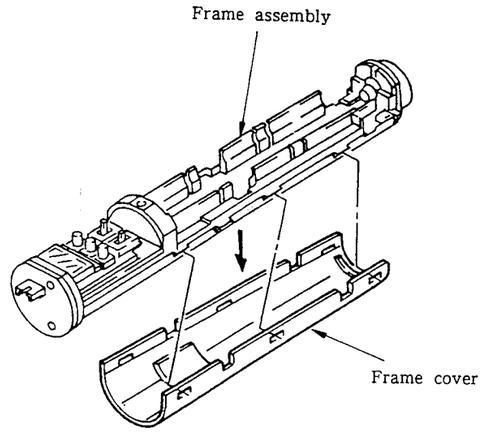
WINDSCREEN ASSEMBLY



GRIP A

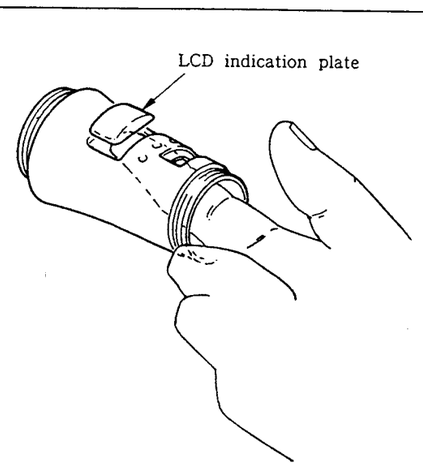


FRAME COVER

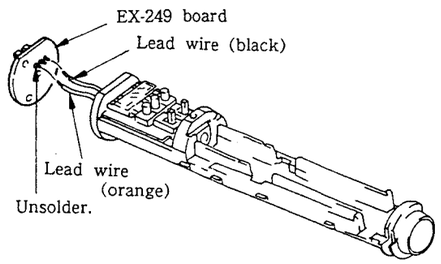


Disengage the 6 hooks holding the frame cover in place and remove the cover.

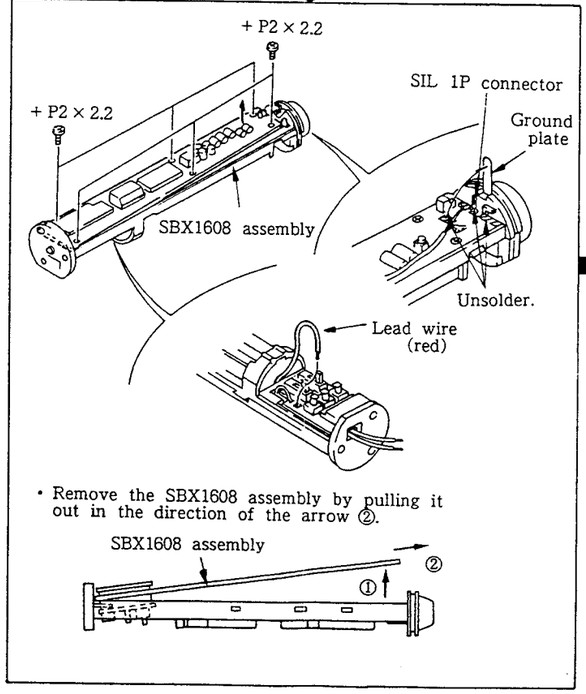
LCD INDICATION PLATE



EX-249 BOARD

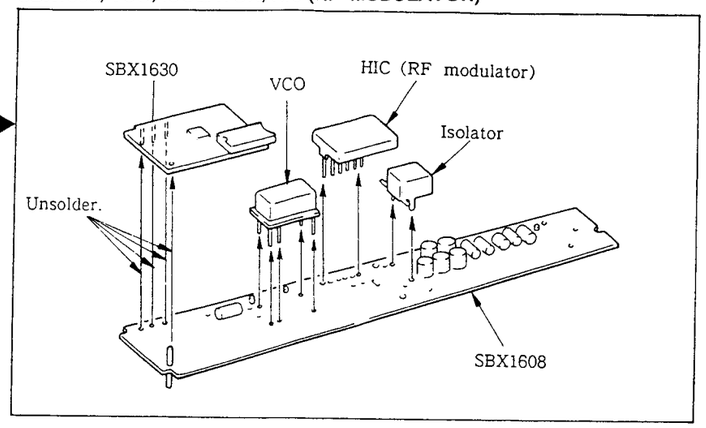


SBX1608 ASSEMBLY

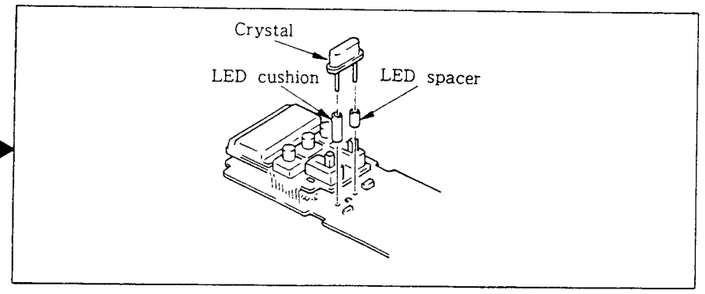


• Remove the SBX1608 assembly by pulling it out in the direction of the arrow ②.

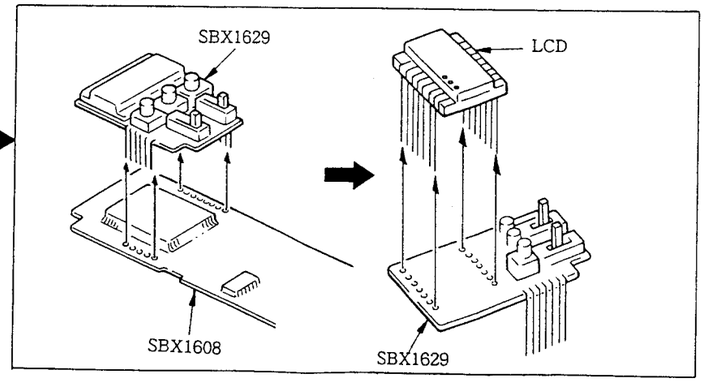
SBX1630, VCO, ISOLATOR, HIC (RF MODULATOR)



CRYSTAL

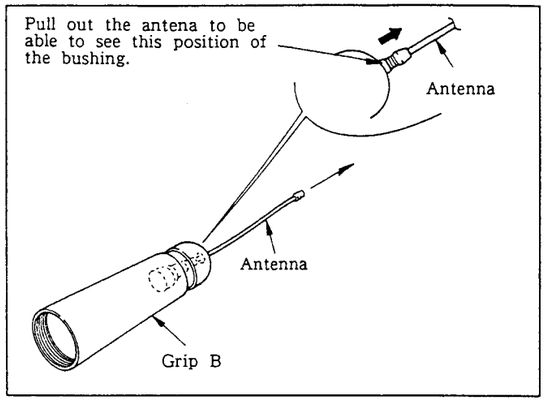


SBX1629 LCD

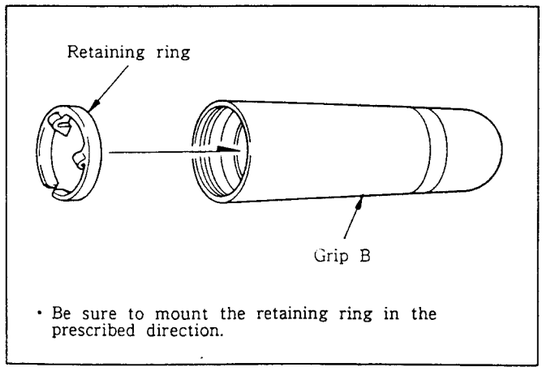


2-2. PRECAUTIONS ON REASSEMBLY

1. ANTENNA

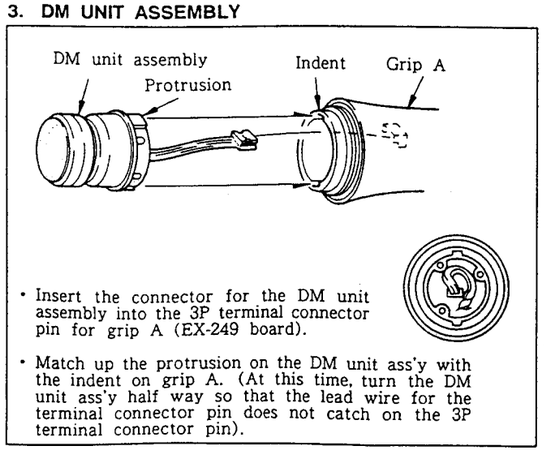


2. RETAINING RING



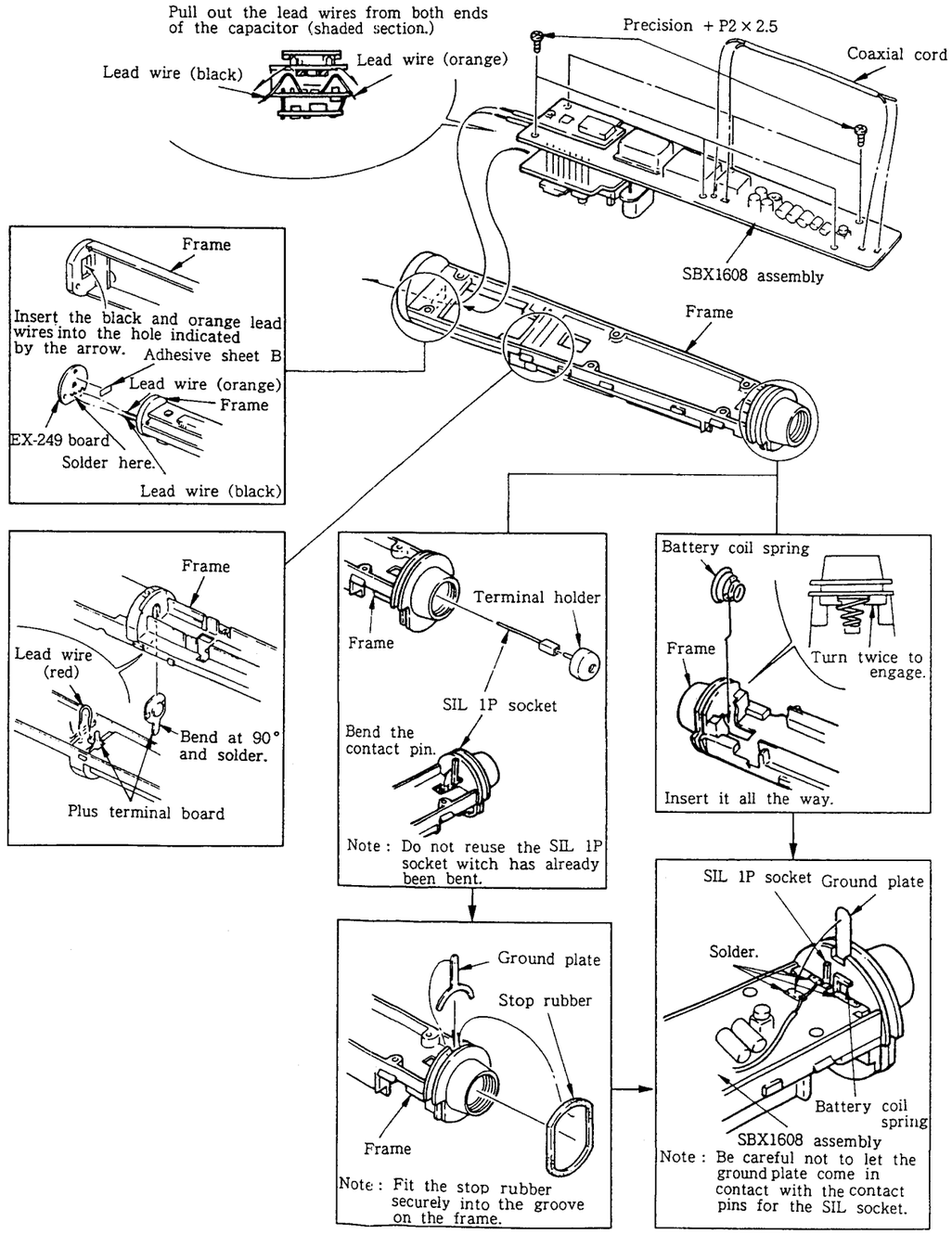
- Be sure to mount the retaining ring in the prescribed direction.

3. DM UNIT ASSEMBLY

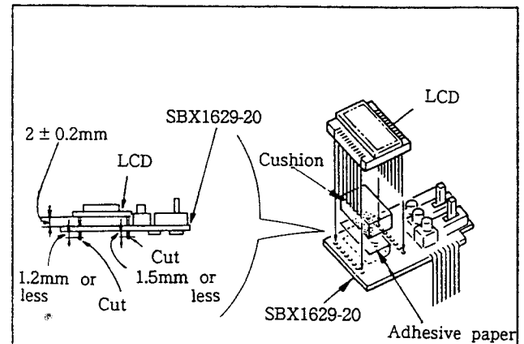


- Insert the connector for the DM unit assembly into the 3P terminal connector pin for grip A (EX-249 board).
- Match up the protrusion on the DM unit ass'y with the indent on grip A. (At this time, turn the DM unit ass'y half way so that the lead wire for the terminal connector pin does not catch on the 3P terminal connector pin).

4. FRAME ASSEMBLY

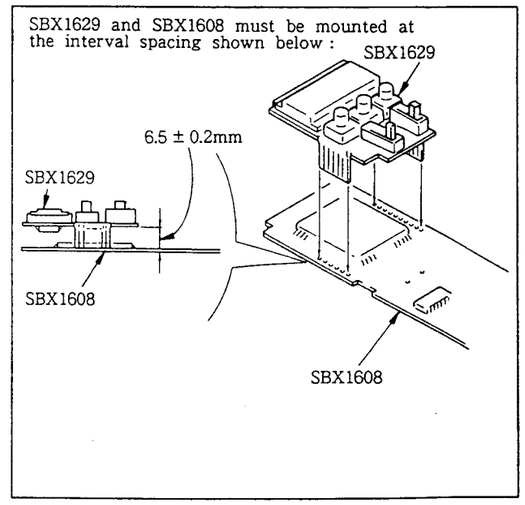

Pull out the lead wires from both ends of the capacitor (shaded section.)
Lead wire (black)
Lead wire (orange)
Precision + P2 × 2.5
Coaxial cord
SBX1608 assembly
Frame
Frame
Insert the black and orange lead wires into the hole indicated by the arrow.
Adhesive sheet B
Lead wire (orange)
Frame
EX-249 board
Solder here.
Lead wire (black)
Frame
Lead wire (red)
Bend at 90° and solder.
Plus terminal board
Terminal holder
Frame
SIL 1P socket
Bend the contact pin.
Note : Do not reuse the SIL 1P socket witch has already been bent.
Battery coil spring
Frame
Turn twice to engage.
Insert it all the way.
Ground plate
Stop rubber
Frame
Note : Fit the stop rubber securely into the groove on the frame.
SIL 1P socket
Ground plate
Solder.
Battery coil spring
SBX1608 assembly
Note : Be careful not to let the ground plate come in contact with the contact pins for the SIL socket.

5. LIQUID CRYSTAL DISPLAY (LCD)

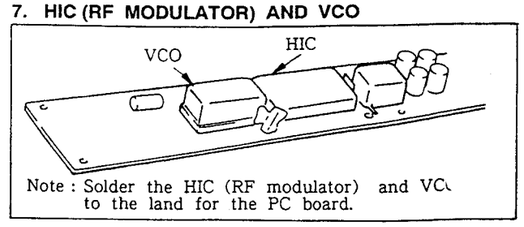


Note : When trimming the contact pins, be careful not to subject the LCD to vibrations.

6. SBX1629



7. HIC (RF MODULATOR) AND VCO



Note : Solder the HIC (RF modulator) and VCO to the land for the PC board.

2-3. NOTE ON PARTS REPLACEMENT

2-3-1. SBX1608, E²PROM (IC203) Replacement

The last data sent to the channel and ATT is written in the E²PROM (IC203). When the power is turned on initially after the E²PROM is replaced, the channel mode (Refer to table below.) is set automatically. In such instances, when you turn the power off, the data will be memorized by the E²PROM and normal operation will be enabled when the power is turned back on.

Version of WRT-810A	Channel number display
WRT-810A (64)	64-01 (Channel)
WRT-810A (66)	66-01 (Channel)
WRT-810A (68)	68-01 (Channel)

2-4. PRECAUTIONS ON CHIP PARTS REPLACEMENT

Tools : Soldering iron of 20 W (Use a temperature controller, if possible, which can set control the iron temperature to 270℃ ± 10℃).
Solder (0.6 mm dia.)
Desoldering metal braid (Solder wick or equivalent)
Tweezers

Soldering conditions : Tip temperature ; 270 ± 10℃
Within the 2 seconds.

1. To remove a resistor or capacitor, place the tip of a soldering iron on chip parts to heat the parts, and then move it horizontally for removal while being desoldered. For removal of a diode or transistor, heat the one side, with two pins, of chip parts at the same time, set the parts up when desoldered, and remove the two pins. And then, remove the pin on another side.
2. Absorb solder by using a desoldering metal braid to smooth the land surface of board after removal.
3. Confirm by visual check that no pattern of the removed chip parts is peeled off and no adjacent parts is damaged or bridged.
4. Perform a thin pretinning on the pattern.
5. Place new chip parts on the pattern to solder its both sides.

Note

- The chip part removed should not be used again.
- When mounting the new chip part, should not shift so that it not short.
- Use the soldering iron verticaly as much as possible.
- When mounting the new chip part, heat it from pattern side. Never contact the tip of the soldering iron to the part.

SECTION 3
ELECTRICAL ADJUSTMENTS

3-1. EQUIPMENT AND TOOLS

Required Instruments

Name	Specifications	Model name
DC POWER SUPPLY	Output voltage : 0 to 5 V, 2 A	–
DC CURRENT METER	Range : 300 mA	–
SPECTRUM ANALYZER	Frequency range : 10 kHz to 2.9 GHz	HP 8560A, ADVANTEST RR3316B
MODULATION ANALYZER	RF input Frequency range : 150 kHz to 3 GHz	ANRITSU MS616B, HP 8901B or equivalent
POWER METER + POWER SENSOR	Range : 3 μW to 100 mW	HP 435B (with power sensor HP 8482A) or equivalent
AUDIO FREQUENCY OSCILLATOR	Oscillation frequency : 20 Hz to 100 kHz Accuracy : 5%	HP 8903B or equivalent
VARIABLE ATTENUATOR	Variable range : 0 to 100 dB Variable step : 0.1 dB	HP 8903B or equivalent
LEVEL METER	Frequency characteristics : 10 Hz to 500 kHz Measurement ranges : −90 to 52 dBm, −90 to 50 dBV Filter : A weighted filter	HP 8903B, MEGURO MN445B or equivalent
DISTORTION ANALYZER	Frequency : 10 Hz to 100 kHz Measurement range : 0.1% to 100% Accuracy : ± 1 dB (20 Hz to 20 kHz)	HP 8903B or equivalent
FREQUENCY COUNTER	Frequency range : 10 Hz to 1000 MHz Effective digits : 10 digits	HP 5385A, HP 8901B or equivalent
OSCILLOSCOPE	Frequency : DC to 10 MHz	–
DIGITAL VOLTMETER	Effective digits : 3 ½ digits	–

Tools

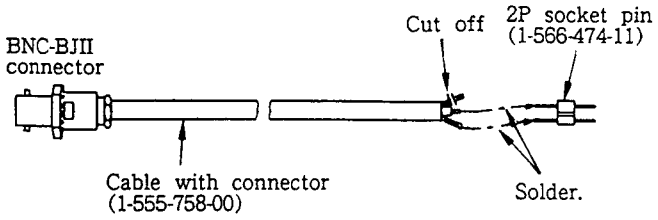
Name	Part No.	Note
Stop ring removal tool	J-6224-470-A	For Grip B removal
LR driver	J-6224-750-A	For removal/mount of Grip A
Adjuster (1.8 mm)	7-721-052-82	–
Output connector fixture	–	Refer to "How to make output connector fixture."
500 Ω termination connector	–	Refer to "How to make 500 Ω termination connector."

How to Make The Output Connector Fixture

Required Parts

Cable with connector (part no. 1-555-758-00) : 1

2P socket pin (part no. 1-566-474-11) : 1

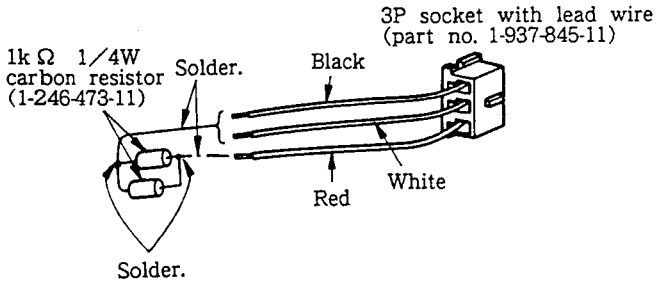


How to Make 500 Ω Termination Connector

Required Parts

3P socket with lead wire (part no. 1-937-845-11) : 1

1 kΩ 1/4 W carbon resistor (part no. 1-246-473-11) : 2



3-2. ADJUSTMENTS

This section describes the adjustments and checks required to meet the specifications. Make adjustment and checks following the procedure below.

3-2-1. +5 V (Vcc) Regulated voltage adjustment

↓

3-2-2. Carrier frequency adjustment

↓

3-2-3. Reference frequency deviation adjustment

↓

3-2-4. Maximum frequency deviation adjustment

↓

3-2-5. Distortion ratio check

↓

3-2-6. S/N check

↓

3-2-7. Frequency characteristics check

↓

3-2-8. RF power output check

↓

3-2-9. Tone signal check

↓

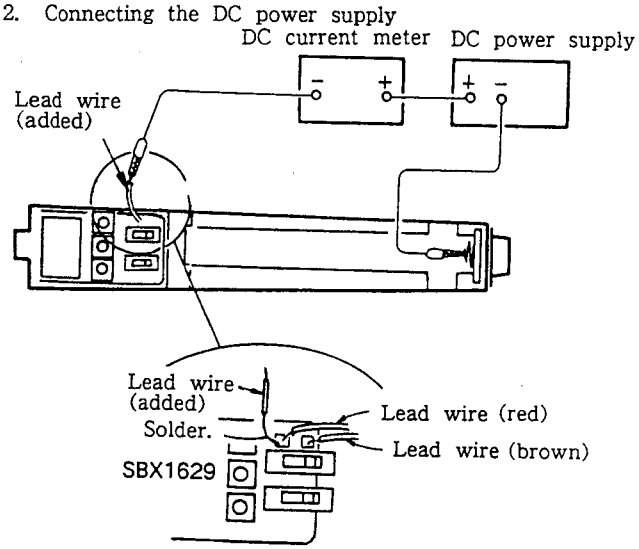
3-2-10. Spurious emissions check

↓

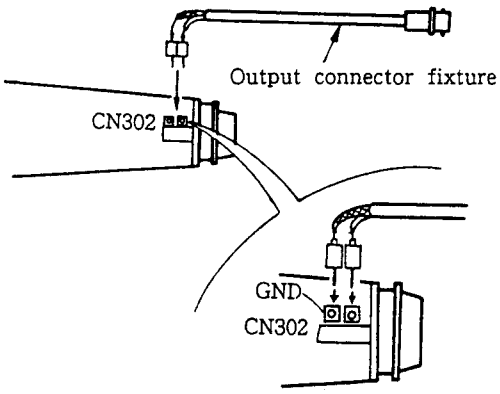
3-2-11. Occupied band width check

Preparations

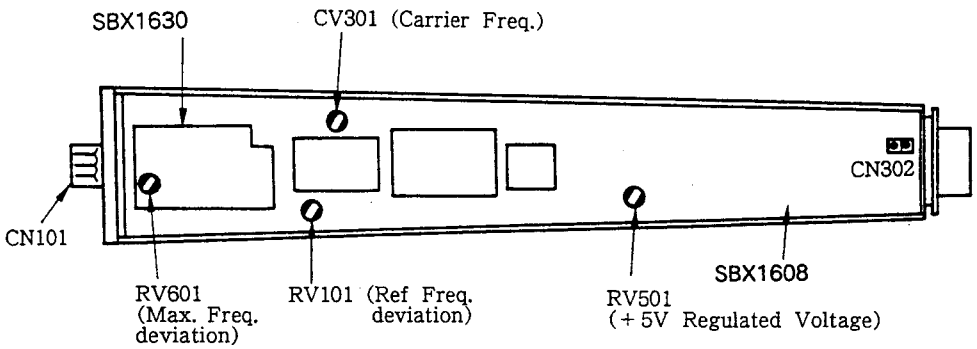
1. Remove the windscreen assembly, DM unit, grips A and B. (Refer to SECTION 2 "SERVICE INFORMATION" for removal.)
2. Connecting the DC power supply



3. Connect the output connector fixture (2P socket pin) to the output terminal (CN302) for the SBX1608.



Adjustment Location



Switches and Control Initial Setting

ATT (input level attenuator) and CH (channel) display

ATT display : 0 dB

Press the "−" button to set 0 dB.

CH display : Channel display corresponding to the table below.

Version of WRT-810A	Channel display
WRT-820A (64)	65-01
WRT-820A (66)	67-01
WRT-820A (68)	6901

(Refer to SECTION 1 "1-5. CHANGING THE CHANNEL SELECTION" for the method of setting the channel.)

AF switch : OFF

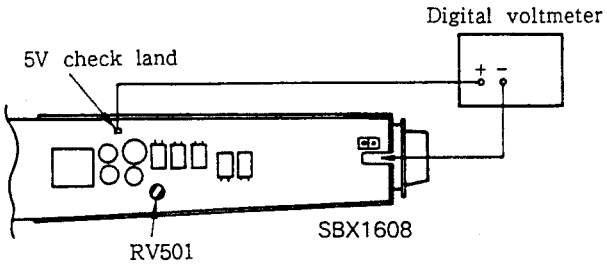
RF Power output switch : 2.5 mW

3-2-1. +5V (Vcc) Regulated Voltage Adjustment

Equipment and Tools

DC power supply
DC output voltage : + 3.0 V $^{+0.5}_{-1.0}$ V
DC current meter
Digital volt meter
Adjuster (1.8 mm) (part no. : 7-721-052-82)

Connection/Adjustment Location



Switch and Control Setting

ATT :	0dB
CH display :	Same as initial setting. (Refer to page 3-3.)
AF switch :	OFF
RF Power output switch :	2.5 mW

Adjustment Procedure

(1) Set the POWER switch on the SBX1629 to ON.
(2) Turn ●RV501 and adjust the DC voltage for the 5V check land on the SBX1608 board so that it matches the specification below :

Specification: DC voltage for the 5 V check land = 5.00 ± 0.05 Vdc (DC current approx. 130 mA at 3 V)

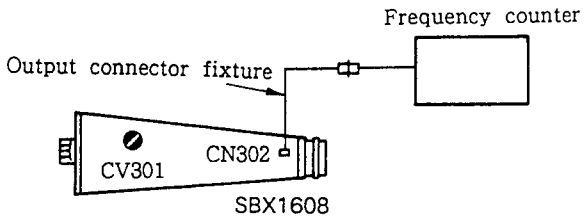
Adjustment: ●RV501/SBX1608

3-2-2. Carrier Frequency Adjustment

Equipment and Tools

DC power supply
DC output voltage : + 3.0 V $^{+0.5}_{-1.0}$ V
DC current meter
Frequency counter
Adjuster (1.8 mm) (part no. : 7-721-052-82)
Output connector fixture

Connections



Switch and Control Setting

ATT :	0dB
CH display :	Same as initial setting. (Refer to page 3-3.)
AF switch :	OFF
RF Power output switch :	2.5 mW

Adjustment Procedure

(1) Connect a frequency counter to the output connector (output connector fixture) for CN302.
(2) Adjust ●CV301 so that the frequency counter reading meets the following specification :

Specification : Carrier frequency mentioned in the table below.

Version of WRT-810A	Carrier frequency
WRT-810A (64)	776.125 MHz ± 1 kHz (65-01ch)
WRT-810A (66)	788.125 MHz ± 1 kHz (67-01ch)
WRT-810A (68)	800.125 MHz ± 1 kHz (69-01ch)

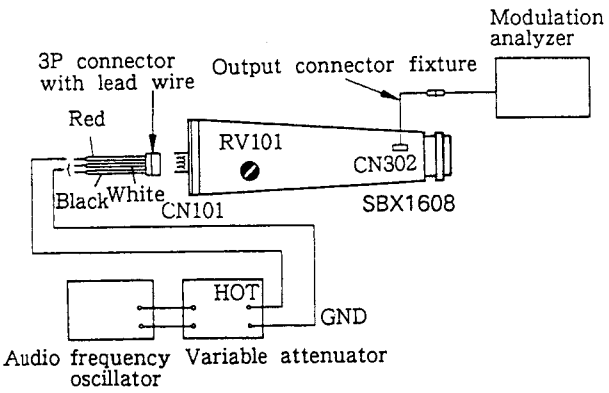
Adjustment : ●CV301/SBX1608

3-2-3. Reference Frequency Deviation Adjustment

Equipment and Tools

DC power supply
DC output voltage : + 3.0 V $^{+0.5}_{-1.0}$ V
DC current meter
Audio frequency oscillator
Variable attenuator
Level meter
Modulation analyzer
MEASUREMENT : FM
MEASUREMENT RANGE : 40 kHz (manual operation)
HPF : 50 Hz
LPF : 15 kHz for HP equipment
20 kHz for ANRITSU equipment
DE EMPHASIS : 50 μS
Adjuster (1.8 mm) (part no. : 7-721-052-82)
3P socket with lead wire (part no. : 1-937-845-11)

Connections/Adjustment Location



Switch and Control Setting

ATT : 0dB
CH display : Same as initial setting. (Refer to page 3-3.)
AF switch : OFF
RF Power output switch : 2.5 mW

Adjustment Procedure

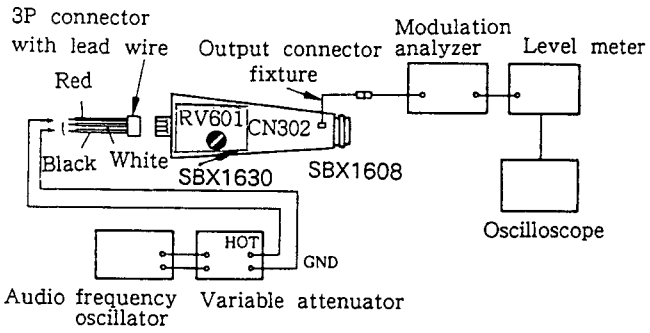
(1) Input 1 kHz, −56 dBV (−53.8 dBm) signal to the CN101 connector.
(2) Adjust ◐RV101 so that the frequency deviation reading on the modulation analyzer meets the following specification.
Specification: Frequency deviation = ± 5 kHz ± 0.1 kHz
Adjustment: ◐RV101/SBX1608

3-2-4. Maximum Frequency Deviation Adjustment

Equipment and Tools

DC power supply
DC output voltage : + 3.0 V $^{+0.5}_{-1.0}$ V
Audio frequency oscillator
Variable attenuator
Level meter
Display indication : RMS
WEIGTING : WIDE BAND (No filter)
Modulation analyzer
MEASUREMENT : FM
MEASUREMENT RANGE : 40 kHz (manual operation)
HPF : 50 Hz
LPF : 15 kHz for HP equipment
20 kHz for ANRITSU equipment
DE EMPHASIS : 50 μS
Oscilloscope
Adjuster (1.8 mm) (part no. : 7-721-052-82)

Connections/Adjustment Location



Switch and Control Setting

ATT : 0dB
CH display : Same as initial setting. (Refer to page 3-3.)
AF switch : OFF
RF Power output switch : 2.5 mW

Adjustment Procedure

(1) Input 1 kHz, −56 dBV (−53.8 dBm) signal to the CN101 connector.
(2) Check the output level for the AF OUT terminal of the modulation analyzer with a level meter. (Check if the deviation reading given for the modulation analyzer is ± 5 kHz $^{\pm 0.1\ \text{kHz}}$)

(3) Set the SENSITIVITY adjuster for the level meter so that the meter reads 0 dB.

(4) Input 1 kHz, −20 dBV (−17.8 dBm) signal to the CN101 connector.

(5) Adjust ●RV601/SBX1630 so that the level meter reads +17.5 dB (in contrast the 0 dB reading given used in (2) above).

Also, check that the deviation reading given by the modulation analyzer meets the following specification :

Specification: Frequency deviation
= ±36.5 kHz ±2.5 kHz

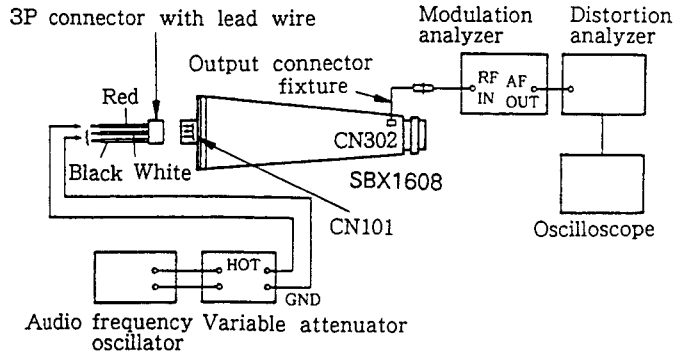
Adjustment: ●RV601/SBX1630

3-2-5. Distortion Ratio Check

Equipment and Tools

DC power supply
DC output voltage : +3.0 V $^{+0.5}_{-1.0}$ V
DC current meter
Audio frequency oscillator
Variable attenuator
Modulation analyzer
MEASUREMENT : FM
MEASUREMENT RANGE : 40 kHz (manual operation)
HPF : 50 Hz
LPF : 15 kHz for HP equipment
20 kHz for ANRITSU equipment
DE EMPHASIS : 50 μS
Distortion analyzer
Oscilloscope
3P socket with lead wire (part no. : 1-937-845-11)

Connections



Switch and Control Setting

ATT : 0dB
CH display : Same as initial setting. (Refer to page 3-3.)
AF switch : OFF
RF Power output switch : 2.5 mW

Procedure

(1) Connect a distortion analyzer to the AF OUT terminal of the modulation analyzer.

(2) Input 1 kHz, −56 dBV (−53.8 dBm) signal to the CN101 connector.

(3) Check that the distortion analyzer reading is less than 1.3%.

(4) Input 1 kHz, −20 dBV (−17.8 dBm) signal to the CN101 connector.

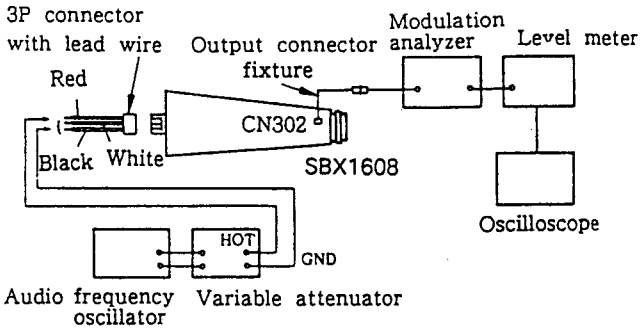
(5) Check that the distortion analyzer is less than 3%.

3-2-6. S/N Check

Equipment and Tools

DC power supply
DC output voltage : +3.0 V $^{+0.5}_{-1.0}$ V
Audio frequency oscillator
Variable attenuator
Level meter
Display mode : RMS
WEIGTING : WIDE BAND
Modulation analyzer
MEASUREMENT : FM
MEASUREMENT RANGE : 40 kHz (manual operation)
HPF : 50 Hz
LPF : 15 kHz for HP equipment
20 kHz for ANRITSU equipment
DE EMPHASIS : 50 μS
Oscilloscope
Adjuster (1.8 mm) (part no. : 7-721-052-82)

Connections



Switch and Control Setting

ATT : 0dB
CH display : Same as initial setting. (Refer to page 3-3.)
AF switch : OFF
RF Power output switch : 2.5 mW

Procedures

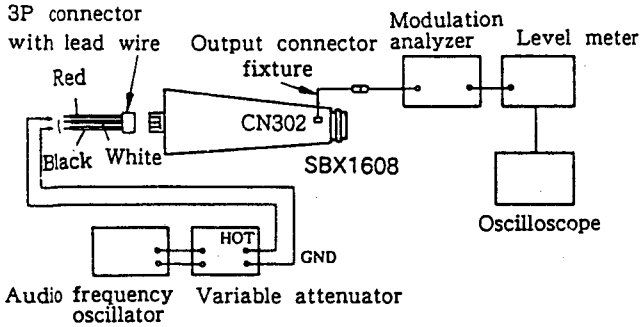
(1) Input 1 kHz, −56 dBV (−53.8 dBm) signal to the CN101 connector.
(2) Set the level meter for the RMS indication.
(3) Set the SENSITIVITY adjuster for the level meter so that the level meter reads 0 dB.
(4) Connect the 500 Ω termination connector to the CN101 connector.
(5) Set the WEIGHTING for the level meter as follows.
WEIGHTING : IEC or A-weighted
(6) Check that the level meter reading is less than −32 dB.

3-2-7. Frequency Characteristics Check

Equipment and Tools

DC power supply
DC output voltage : +3.0 V$^{+0.5}_{-1.0}$ V
Audio frequency oscillator
Variable attenuator
Level meter
Display mode : RMS
WEIGTING : WIDE BAND
Modulation analyzer
MEASUREMENT : FM
MEASUREMENT RANGE : 40 kHz
(manual operation)
HPF : 50 Hz
LPF : 15 kHz for HP equipment
20 kHz for ANRITSU equipment
DE EMPHASIS : 50 μS
Oscilloscope
Adjuster (1.8 mm) (part no. : 7-721-052-82)

Connections



Switch and Control Setting

ATT :	0dB
CH display :	Same as initial setting. (Refer to page 3-3.)
AF switch :	OFF
RF Power output switch :	2.5 mW

Procedures

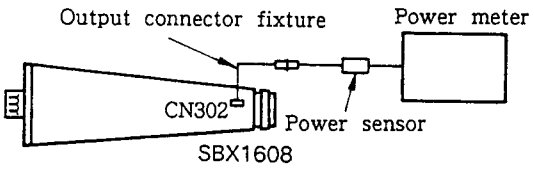
(1) Input 1 kHz, −56 dB (−53.8 dBm) signal to the CN101 connector.
(2) Read the indication on the level meter.
(The WEIGHTING for the level meter must be set to DIN/AUDIO.)
(3) Set the SENSITIVITY adjuster on the level meter so that the meter reads 0 dB.
(4) Switch the oscillation frequency for the audio frequency oscillator from 1 kHz to 100 Hz.
(5) Check that the reading for the level meter is −1.0 ±1.0 dB).
(6) Switch the oscillation frequency for the low frequency oscillator from 100 Hz to 10 kHz.
(7) Check that the reading for the level meter remains within −1.0 ±1.0 dB).

3-2-8. RF power Output Check

Equipment and Tools

DC power supply
DC output voltage : +3.0 V$^{+0.5}_{-1.0}$ V
DC current meter
Power meter (using a power sensor)

Connection

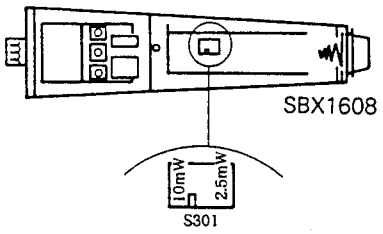


Switch and Control Setting

ATT :	0dB
CH display :	Same as initial setting. (Refer to page 3-3.)
AF switch :	OFF
RF Power output switch :	2.5 mW

Procedure

(1) Connect the power meter to the output connector fixture.
(2) Set the RF power output select switch (S301) on the SBX1608 to the 10 mW side.



RF power output select switch

(3) Check that the reading for the power meter remains within 10 $^{+2}_{-5}$ mW

(4) Set the switch (S301) of the SBX1608 to 2.5 mW.

(5) Make sure that the reading for the power meter remains within 2.5 $^{+0.5}_{-1.25}$ mW.

3-2-9. Tone Signal Check

Equipment and Tools

DC power supply

DC output voltage : + 3.0 V $^{+0.5}_{-1.0}$ V

DC current meter

Frequency counter

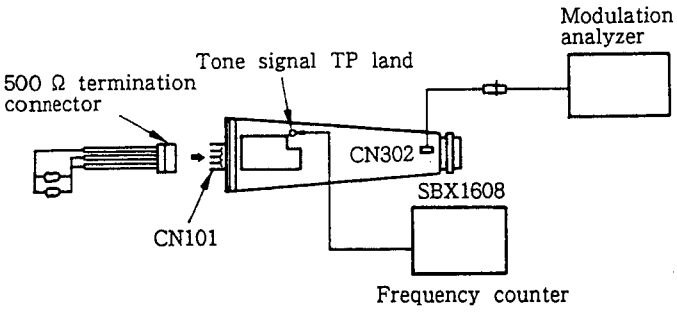
Modulation analyzer

MEASUREMENT :	FM
MEASUREMENT RANGE :	40 kHz (manual operation)
HPF :	4 kHz (300 Hz*)
LPF :	> 20 kHz
DE EMPHASIS :	50 μS

500 Ω termination connector

Output connector fixture

Connection



Switch and Control Setting

ATT :	0dB
CH display :	Same as initial setting. (Refer to page 3-3.)
AF switch :	OFF
RF Power output switch :	2.5 mW

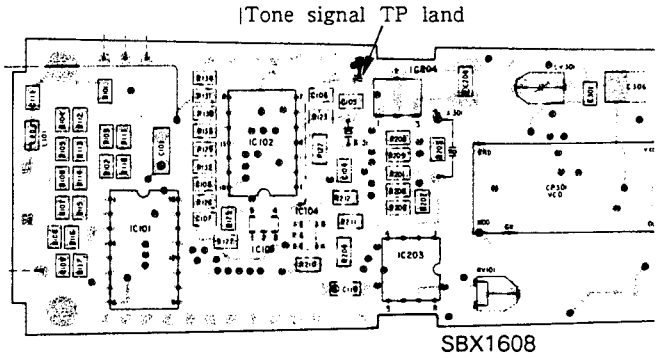
Procedures

(1) Connect a modulation analyzer to the output connector fixture.

(2) Connect a 500 Ω termination connector to the CN101 connector.

(3) Make sure that deviation reading given by the modulation analyzer is within ± 1.7 kHz ± 0.5 kHz.
(On HP equipment, the HPF has a cut off 300 Hz, given a diviation within ± 2.3 kHz ± 0.5 kHz)

(4) Connect the frequency counter to the tone signal TP land. (Refer to the diagram below.)



(5) Check that the reading for the frequency counter remains within 32.768 kHz ± 1 Hz.

3-2-10. Spurious Emissions Check

Equipment and Tools

DC power supply

DC output voltage : + 3.0 V $^{+0.5}_{-1.0}$ V

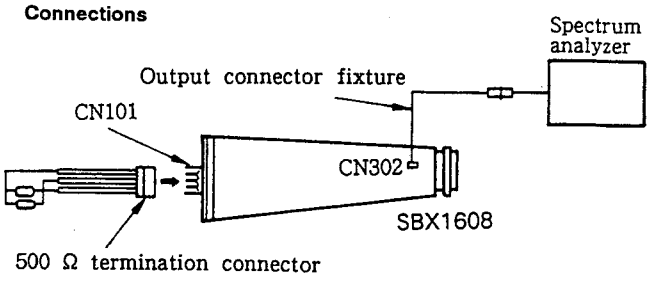
DC current meter

Spectrum analyzer

500 Ω termination connector

Output connector fixture

Connections



Switch and Control Setting

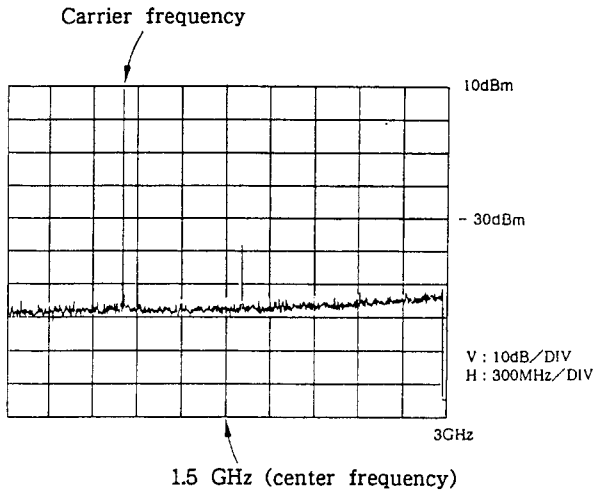
ATT :	0dB
CH display :	Same as initial setting. (Refer to page 3-3.)
AF switch :	OFF
RF Power output switch :	2.5 mW

Procedures

(1) Set the spectrum analyzer as below :

CENTER FREQUENCY :	1.5 GHz
REFERENCE LEVEL :	10 dBm
FREQUENCY SPAN :	3 GHz (300 MHz/DIV)
RBW (resolution band width) :	300 kHz
ATT :	20 dB

(2) Check if the spurious emissions level for the spectrum analyzer remains below − 30 dBm.

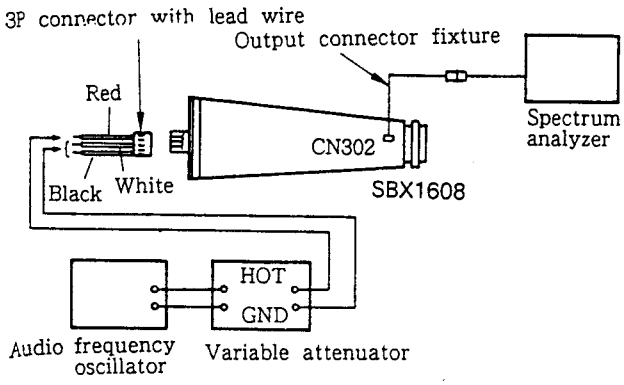


3-2-11. Occupied Band Width Check

Required Instruments

DC regulated voltage power source
DC output voltage : + 3.0 V $^{+0.5}_{-1.0}$ V
DC ammeter
Audio frequency oscillator
Variable attenuator
Spectrum analyzer

Connections



Switch and Control Setting

ATT :	0dB
CH display :	Same as initial setting. (Refer to page 3-3.)
AF switch :	ON
RF Power output switch :	10 mW

Procedures

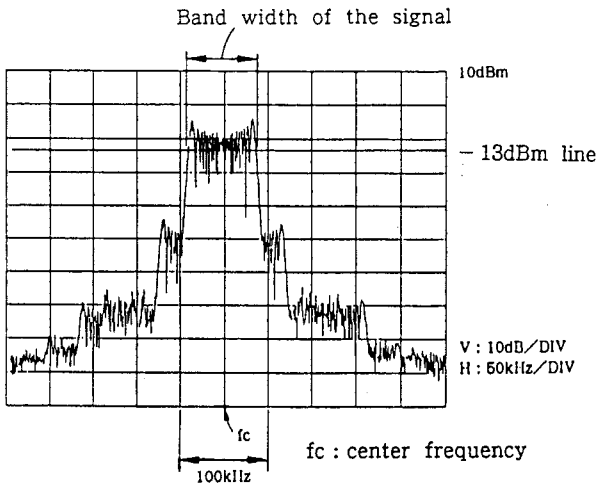
(1) Set the spectrum analyzer as below.
CENTER FREQUENCY : Frequency corresponding to the table below.

Version of WRT-810A	Frequency (MHz)
WRT-810A (64)	776.125 (65-01ch)
WRT-810A (66)	788.125 (67-01ch)
WRT-810A (68)	800.125 (69-01ch)

REFERENCE LEVEL :	10 dBm
FREQUENCY SPAN :	500 kHz (50 kHz/DIV)
RBW (resolution band width) :	1 kHz
VBW (Video band width) :	1 kHz
ATT :	20 dB

(2) Input 1 kHz, − 20 dBV (− 17.8 dBm) signal to the CN101 connector.

(3) Check if the band width of the signal remains below 100 kHz at the − 13 dBm level line for the Spectrum analyzer.



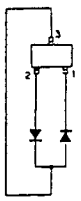
SECTION 4
SEMICONDUCTOR PIN ASSIGNMENTS

ICs, transistors and diodes whoses functions are equivalent are described hear. Therefore, incompatible device names may be described together. For parts replacement, refer to the Spare Parts section in this manual.

The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

DA204U

–TOP VIEW–

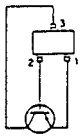


SB07-03CP

–TOP VIEW–

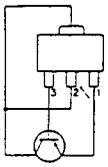
2SA1586

–TOP VIEW–



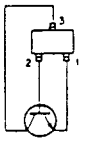
2SB1120

–TOP VIEW–



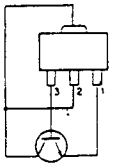
2SC4116

–TOP VIEW–



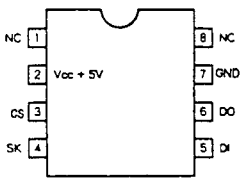
2SD1620

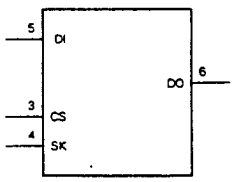
–TOP VIEW–



BR93C46F (ROHM)
C MOS 64 x 16 BIT EEPROM

–TOP VIEW–

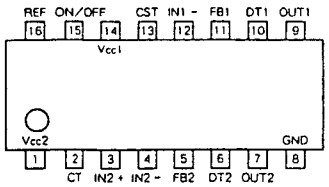


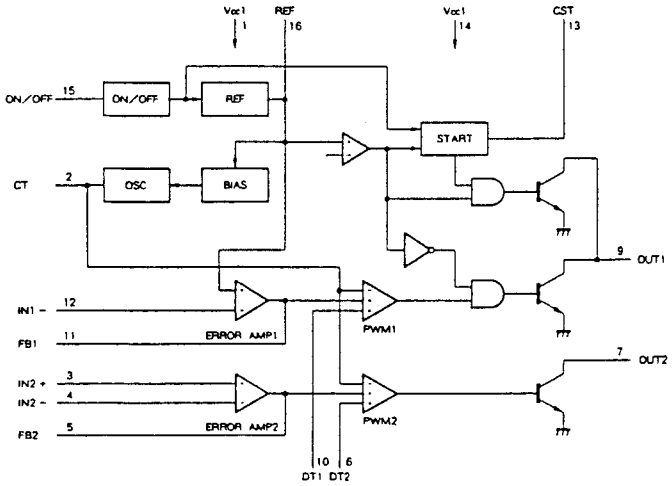


DI : OPE CODE, ADDRESS AND SERIAL DATA INPUT
DO : SERIAL DATA OUTPUT
CS : CHIP SELECT INPUT
SK : SERIAL DATA CLOCK INPUT

FA7616N (FUJI ELECT.)
PWM SWICHING MODE POWER SUPPLY CONTROLLER

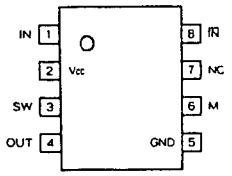
–TOP VIEW–

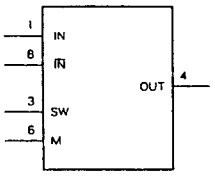




MB501SL (FUJITSU)

–TOP VIEW–

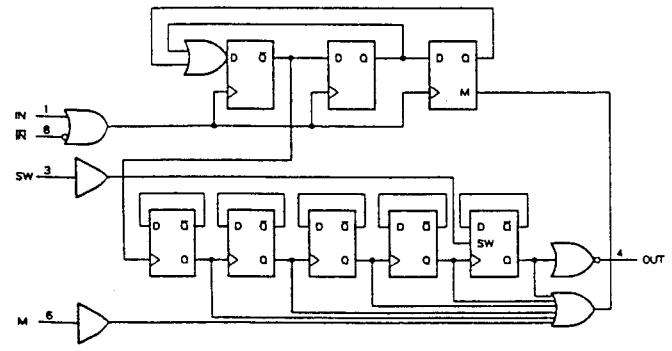




IN : INPUT
IN :
SW : DIVIDING RATIO SELECT
M : MODULE ESTABLISHMENT

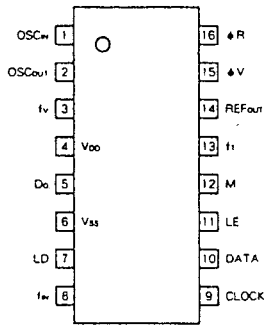
SW	M	Dividing ratio
H	H	1/64
H	L	1/65
L	H	1/128
L	L	1/129

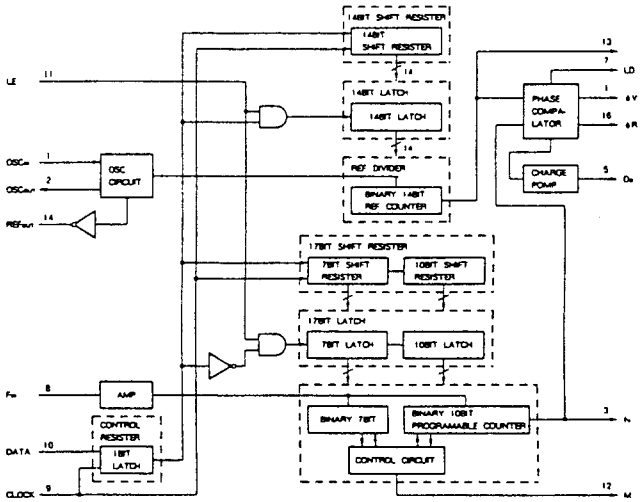
Note : SW : H = Vcc, L = open
M : H = 2.0V~Vcc
L = GND~0.8V



MB87006A (FUJITSU)
C MOS PLL FREQUENCY SYNTHESIZER

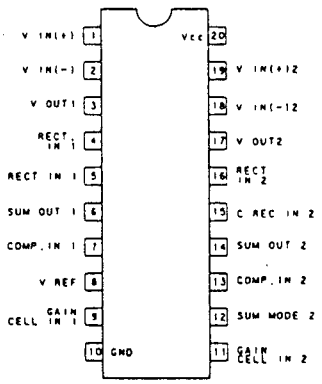
–TOP VIEW–

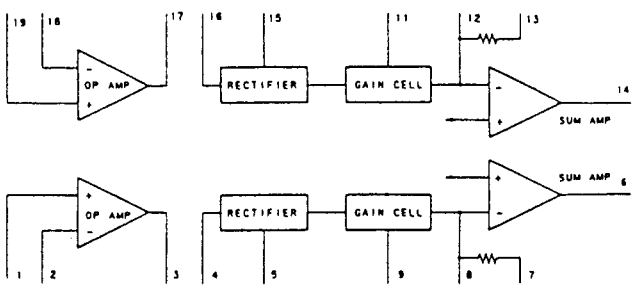




NE575D (SIGNETICS)
LOW VOLTAGE COMPANDOR

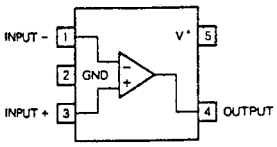
–TOP VIEW–





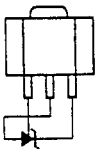
NJM2406F (JRC)
COMPALATOR

–TOP VIEW–



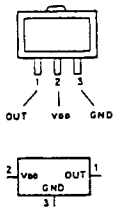
NJM431U (JRC)

–TOP VIEW–



S-8054ALB(SEIKO)
VOLTAGE DETECTOR WITH CMOS OUTPUT

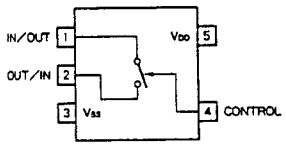
–TOP VIEW–



OUTPUT VOLTAGE	S-805?AL?-L?
+3.0V	S-8052ALR-LF S-8052ALO-LG
+4.5V	S-8053ALB-LI S-8053ALR-LJ
+6.0V	S-8054ALB-LM S-8054ALR-LN

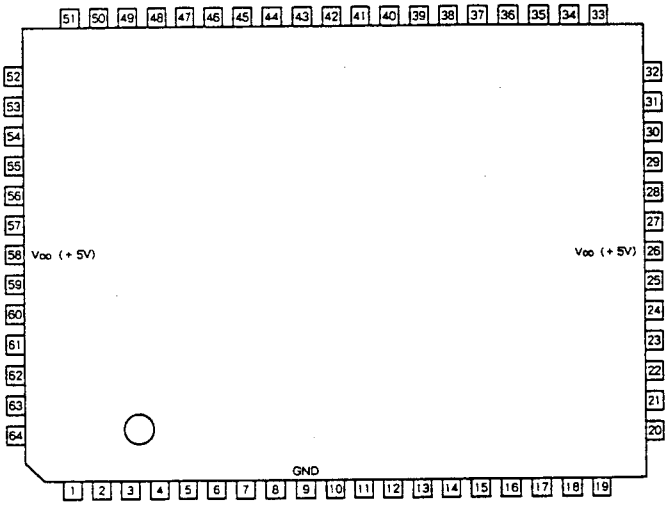
SC14S66FEL(MOTOROLA)
BILATERAL SWITCH

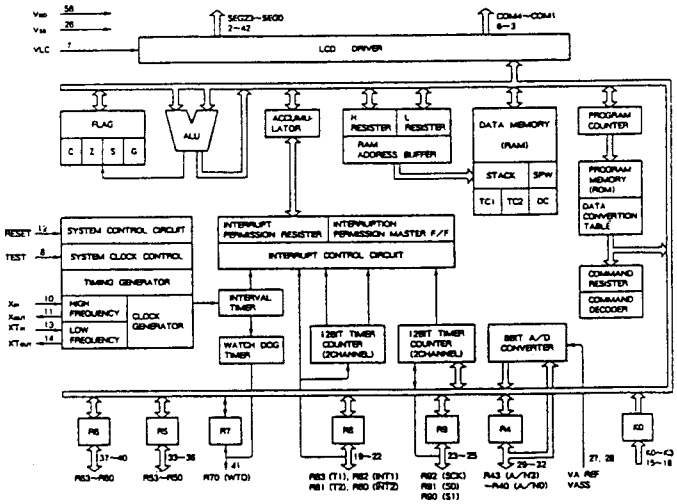
–TOP VIEW–



TMP47C446AF (TOSHIBA)
4 BIT MICRO COMPUTER

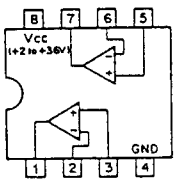
–TOP VIEW–





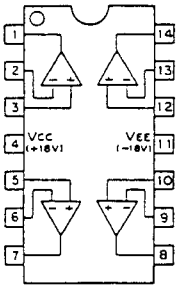
μPC393G2 (NEC)
DUAL VOLTAGE COMPARATORS

–TOP VIEW–



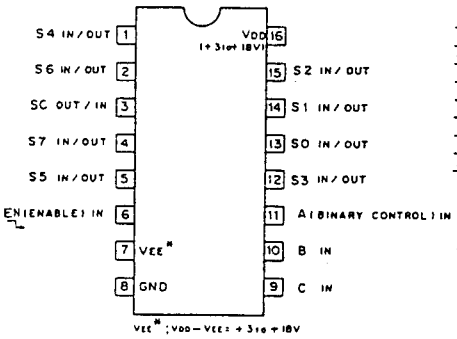
μPC4574G2 (NEC)
OPERATIONAL AMPLIFIER

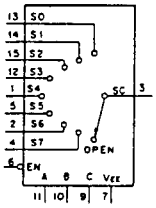
–TOP VIEW–



μPD4051BG (NEC)
C MOS 8CHANNEL MULTIPLEXER/DEMULTIPLEXER

–TOP VIEW–


S4 IN / OUT 1
S6 IN / OUT 2
SC OUT / IN 3
S7 IN / OUT 4
S5 IN / OUT 5
EN(ENABLE) IN 6
VEE* 7
GND 8
VDD 16
S2 IN / OUT 15
S1 IN / OUT 14
S0 IN / OUT 13
S3 IN / OUT 12
A (BINARY CONTROL) IN 11
B IN 10
C IN 9
VEE* ; VDD − VEE = + 3 to + 18V

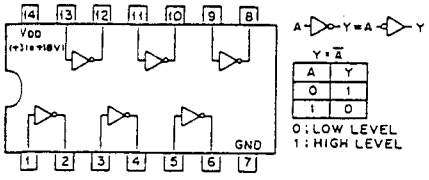


EN	C	B	A	"ON" CHANNEL
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	X	X	X	OPEN

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

μPD4069UBG (NEC)
CMOS INVERTER

–TOP VIEW–



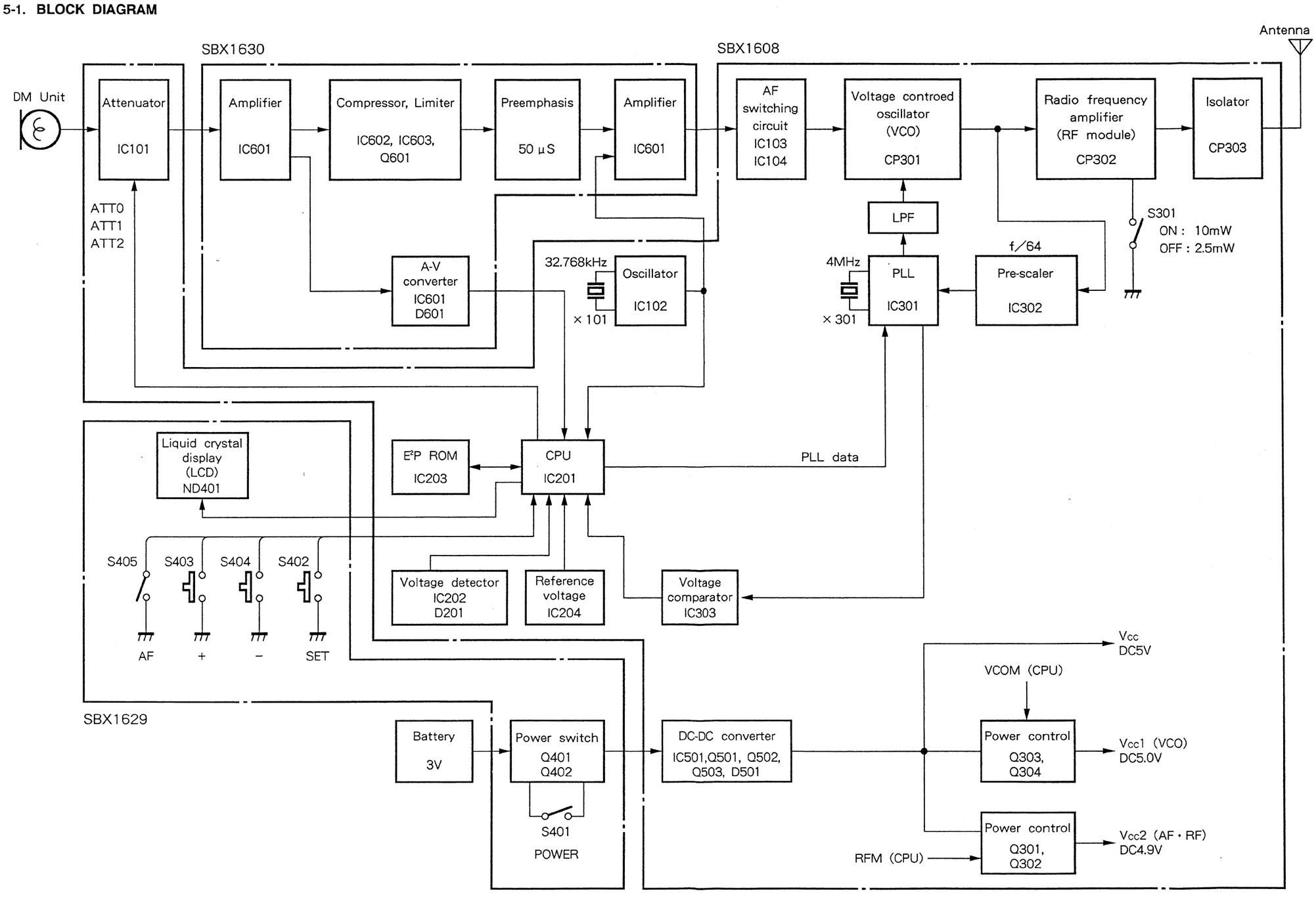
Y = $\overline{A}$

A	Y
0	1
1	0

0 ; LOW LEVEL
1 ; HIGH LEVEL

SECTION 5
BLOCK DIAGRAM, BOARD LAYOUT, SCHEMATIC DIAGRAM AND LEVEL DIAGRAM

5-1. BLOCK DIAGRAM



Overvirw

The WRT-810A consis
SBX1608 ····· Ref. n
SBX1629 ····· Ref. n
SBX1630 ····· Ref. n

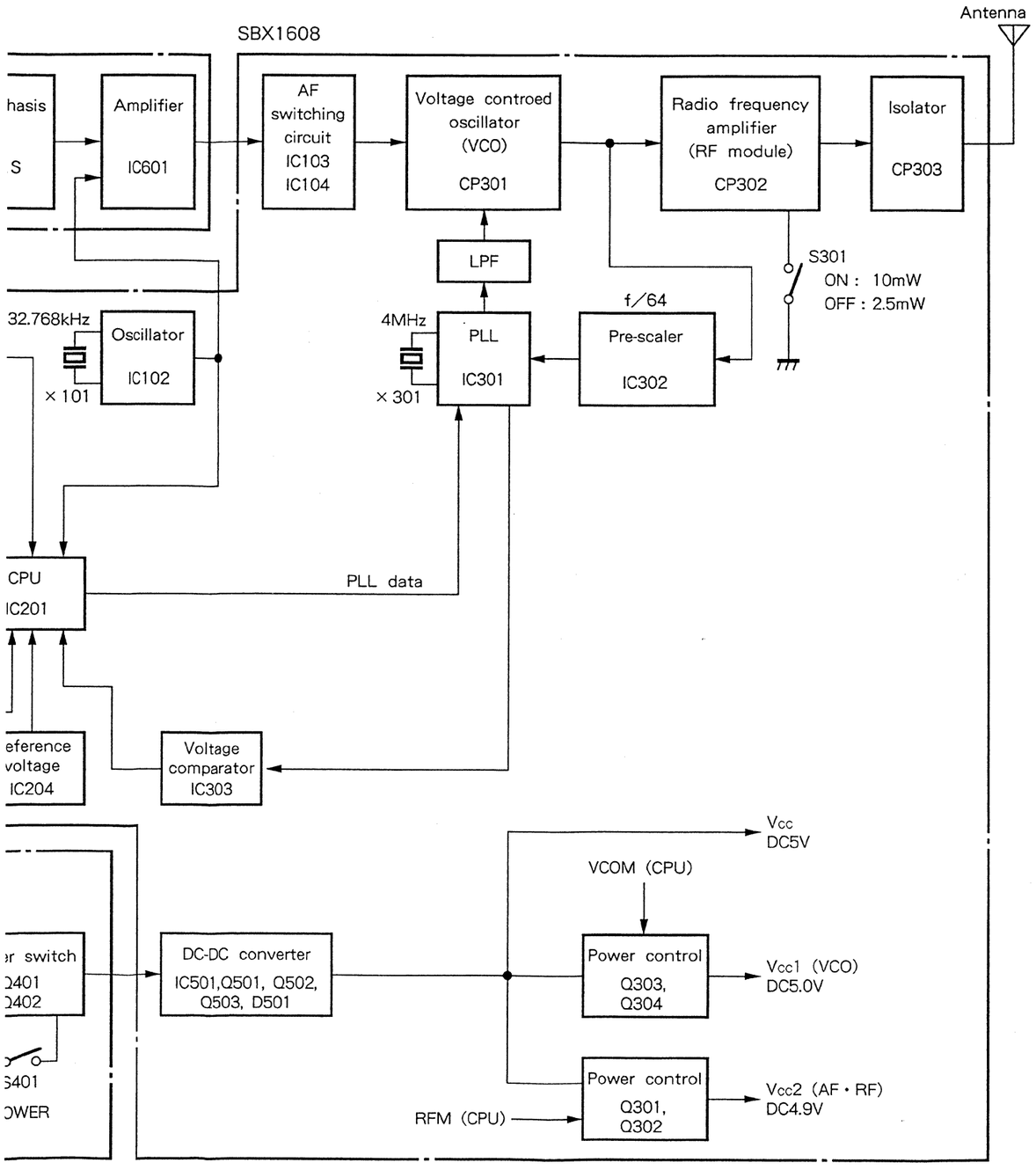
Audio Block (SBX1608,

The AUDIO signal se
ATT circuit.
The ATT can be set
by switching the resist
The CONTROL signal
signal (ATT0, ATT1,
This signal is set by
(S403, S404) input to
The AUDIO signal wh
the ATT circuit is a
compressor and pre-e
is compressed a sign
circuit and then input
circuit. Note that the
The limiter circuit det
and controls (Q601) t
IC602. The AUDIO sig
(32.768 kHz) by the
then sent to the RF
The A-V conversion ci
signal and converts it
(ALO signal) is then
the input AUDIO sign

RF Block (SBX1608)

The oscillation circuit
method. The VCO
modulator for the car.
Carrier frequencies (W
WRT-810A (66) : 782.1
794.125 to 805.875 M
(PLL data) sent fro
(IC301).
The pre-scaler (IC302
signal) that utilizes a
a dividing ratio of 1/
signal amplified by th
output from the anten
the voltage comparato
PLL is locked and in
The locked condition

VEL DIAGRAM



Overvirw

The WRT-810A consists of the following units :
SBX1608 ····· Ref. no. 100s, 200s, 300s, 500s
SBX1629 ····· Ref. no. 400s
SBX1630 ····· Ref. no. 600s

Audio Block (SBX1608, SBX1630)

The AUDIO signal sent from the DM unit is input to the ATT circuit.
The ATT can be set (within 0 to 21 dB, in 3 dB steps) by switching the resistance using the analog switch (IC101). The CONTROL signal for the analog switch is the 3-bit signal (ATT0, ATT1, ATT2) sent from the CPU (IC201). This signal is set by the information on +/− switches (S403, S404) input to the CPU.
The AUDIO signal which underwent volume adjustment at the ATT circuit is amplified by IC601, then input to the compressor and pre-emphasis circuits. Next, AUDIO signal is compressed a signal level of 2 : 1 by the compressor circuit and then input to the limiter circuit via the emphasis circuit. Note that the pre-emphasis is 50 μS.
The limiter circuit detects the AUDIO signal level at IC603 and controls (Q601) the gain for the amplifier built into IC602. The AUDIO signal is mixed with the TONE signal (32.768 kHz) by the amplifier (IC601, approx. 11 dB amp.), then sent to the RF section.
The A-V conversion circuit (IC601, D601) detects the AUDIO signal and converts it to the DC level. The converted signal (ALO signal) is then sent to the CPU. This signal indicates the input AUDIO signal level on the display (ND401).

RF Block (SBX1608)

The oscillation circuit utilizes the PLL frequency synthesizer method. The VCO (CP301) acts as an oscillator and modulator for the carrier frequency though voltage control. Carrier frequencies (WRT-810A (64) : 770.125 to 781.875 MHz, WRT-810A (66) : 782.125 to 793.875 MHz, WRT-810A (68) : 794.125 to 805.875 MHz) are controlled by the serial data (PLL data) sent from the CPU (IC201) to the PLL IC (IC301).
The pre-scaler (IC302) is controlled by the PLL IC (M signal) that utilizes a "swallow" counter method based on a dividing ratio of 1/64 and 1/65. With, this method, the signal amplified by the high frequency amplifier (CP302) is output from the antenna through the isolator (CP303), while the voltage comparator (IC303) detects whether or not the PLL is locked and informs the condition to the CPU.
The locked condition is detected by using an output signal (LD signal) from the phase comparator in the PLL IC.
The voltage control circuit (Q303, Q304) performs ON/OFF control for the Vcc1 power voltage of the VCO using the VCOM signal output from the CPU as the control signal. (When the VCOM signal switches to "L", the VCO circuit turns ON.)
Also, another voltage control circuit (Q301, Q302) performs ON/OFF power control of the Vcc2 power voltage for the AF and RF circuits using the RFM signal output by the CPU as the control signal. (When the RFM signal switches to "H", power is supplied to the AF/RF circuits.)

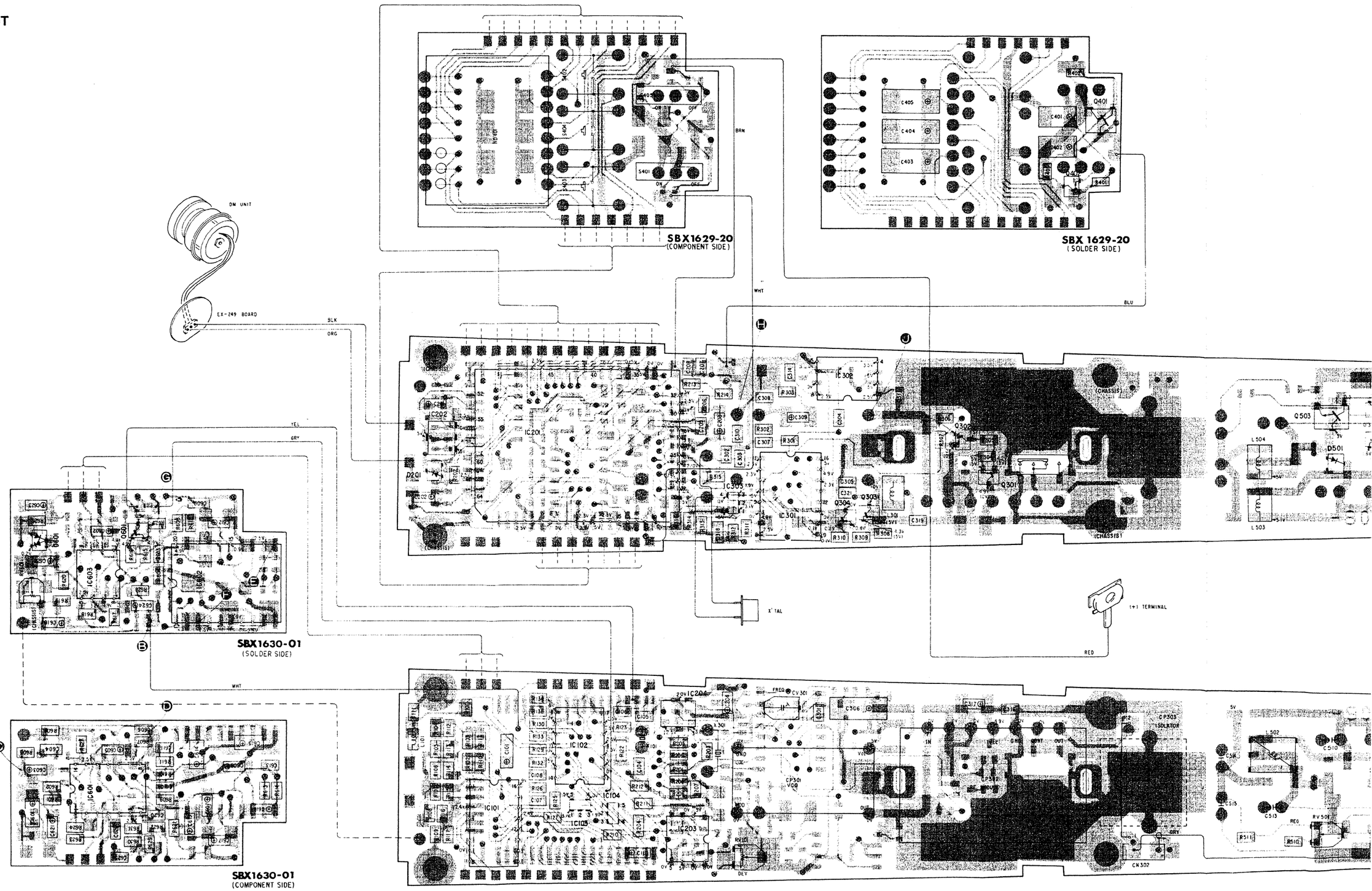
CPU and Its Peripheral Circuits (SBX1608)

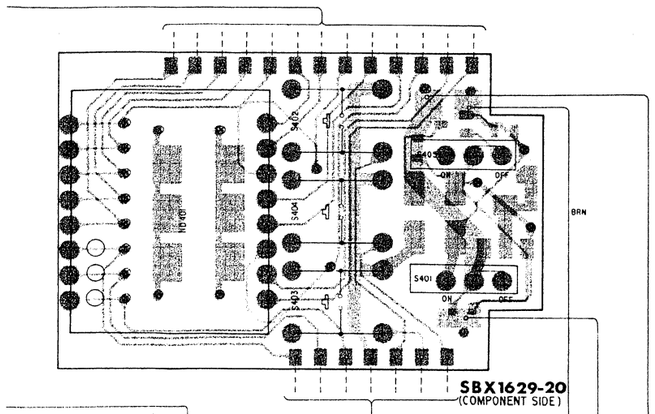
The CPU (IC201) is a 4-bit microprocessor.
Two clock types (4 MHz and 32.768 kHz) are used. The CPU transmits the PLL data and controls the AF mute, RF mute, ATT, LCD display (ND401) and so forth.
The channel and the data on the amount of ATT just before the POWER switch is turned OFF are memorized by the E²PROM (IC203). When the power turns back on, the data stored in the E²PROM is sent to the CPU and both the same channel and the ATT in effect before the power was turned off are reactivated.
Data in the E²PROM will be maintained even if the battery is removed after the power is turned off.
The voltage detector citcuit (IC202, D201) detects the output voltage (Vcc, 5 V) from the DC-DC converter circuit in the power supply block and uses it to reset the CPU.
Also, the reference voltage circuit (IC204) generates 3.8 V which is used as the reference by the CPU for detecting the battery voltage along with the Vcc and AF indicator voltages.

Power Supply Blocks (SBX1608, SBX1629)

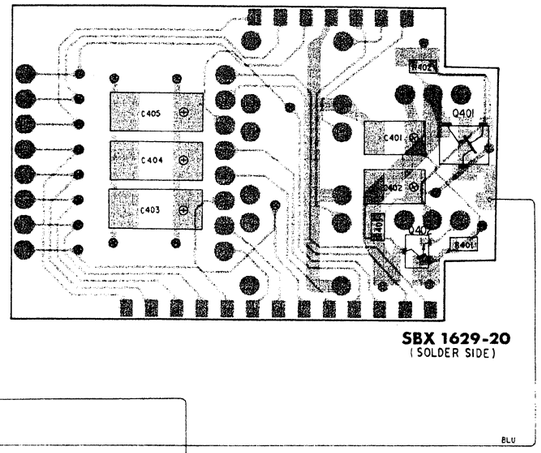
The DC-DC converter circuit (IC502, Q501, Q502, Q503) extracts the 5 V (Vcc) from the battery voltage (3 V) and supplies it to individual circuits.
The power swich circuit (S401, Q401, Q402) performs ON/OFF control for the voltage input to the DC-DC converter. This circuit is controlled by power switch (S401). Also, the delay circuit (R401, C401) controls the delay when the power is turned OFF.

5-2. BOARD LAYOUT

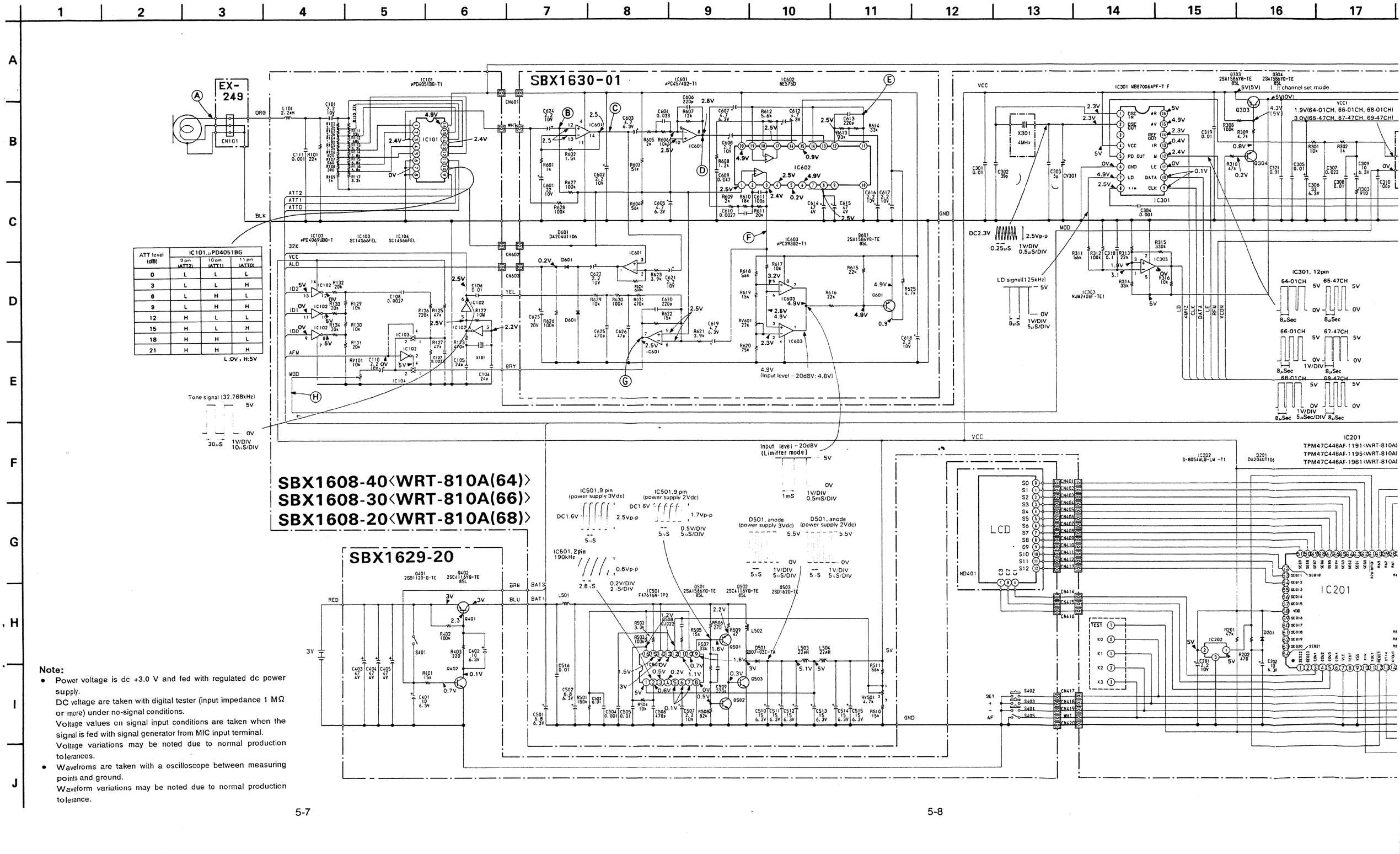




SBX1629-20
(COMPONENT SIDE)



5-3. SCHEMATIC DIAGRAM



Note:

- Power voltage is dc +3.0 V and fed with regulated dc power supply.
  DC voltage are taken with digital tester (input impedance 1 MΩ or more) under no-signal conditions.
  Voltage values on signal input conditions are taken when the signal is fed with signal generator from MIC input terminal.
  Voltage variations may be noted due to normal production tolerances.
- Wavefroms are taken with a oscilloscope between measuring points and ground.
  Waveform variations may be noted due to normal production tolerance.

7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

A B C D E F G H I J

SBX1630-01

IC601 APC4574B2-T1

IC602 NE575D

D601 DA204U106

Q601 2SA1586YG-TE 85L

IC603 APC39302-T1

IC601 F47616N-TP2

Q501 2SA1586YG-TE 85L

Q502 2SC4116YG-TE 85L

Q503 2SD1620-TE

D501 SB07-03C-TA

4.9V (Input level – 20dBV: 4.8V)

Input level – 20dBV (Limiter mode)

IC501, 9 pin (power supply 3Vdc)

IC501, 9 pin (power supply 2Vdc)

IC501, 2 pin 190kHz

D501, anode (power supply 3Vdc)

D501, anode (power supply 2Vdc)

VCC

IC301 MB87006APF-T F

X301 4MHz

Q303 2SA1586YG-TE 85L

Q304 2SA1586YG-TE 85L

( ): channel set mode

VCC1

1.9V(64-01CH, 66-01CH, 68-01CH)

3.0V(65-47CH, 67-47CH, 69-47CH)

L301 22nH

IC302 MB501SL-T1

Q301 2SA1586YG-TE 85L

Q302 2SC4116YG-TE 85L

CP301 VCO

CP302 RF MODULE

CP303 ISOLATOR

ANT

DC2.3V

0.25μS 1V/DIV 0.5μS/DIV 2.5Vp-p

LD signal(125kHz)

8μS 1V/DIV 5μS/DIV

IC303 NJW2406F-TE1

MOD

LD 4MHZ CLK DATA LE RFN VCOM

IC301, 12pin

64-01CH 65-47CH 66-01CH 67-47CH 68-01CH 69-47CH

8μSec 1V/DIV 5μSec/DIV

IC201, TMP47C446AF pin voltage

Pin No.	voltage(V)	Pin No.	voltage(V)	Pin No	voltage(V)	Pin No.	Pin No.
1	*	17	5/0*2	33	0	49	2.5
2	2.5	18	5	34	0	50	2.5
3	2.5	19	0	35	5	51	2.5
4	2.5	20	5	36	0/5*1	52	2.5
5	2.5	21	0	37	0	53	2.5
6	2.5	22	5	38	0	54	2.5
7	0	23	0/5*4	39	0	55	2.5
8	0	24	4.2/0*3	40	0	56	2.5
9	0	25	0	41	5	57	2.5
10	2.3	26	5	42	2.5	58	5
11	2.9	27	3.8	43	2.5	59	2.5
12	5.0	28	0	44	2.5	60	2.5
13	2.5	29	0/0.2*5	45	2.5	61	2.5
14	2.5	30	3	46	2.5	62	2.5
15	5/0*1	31	2.5	47	2.5	63	2.5
16	5/0*2	32	3	48	2.5	64	2.5

*1 : when SET button is pressed. 0V
*2 : when "+"button is pressed. 0V
*3 : when "–"button is pressed. 0V
*4 : channel set mode 5V
*5 : channel set mode 0V
*6 : when input audio signal is –60dBV. 0.2V
*7 : power is off mode. 5V

VCC

IC202 S-8054ALB-LW -T1

D201 DA204U106

IC201 TPM47C446AF-1191<WRT-810A(64)> TPM47C446AF-1195<WRT-810A(66)> TPM47C446AF-1961<WRT-810A(68)>

IC203 BR93C46F-T2

IC204 NJM4310-TE1

LCD

ND401

S0 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12

CN401 CN402 CN403 CN404 CN405 CN406 CN407 CN408 CN409 CN410 CN411 CN412 CN413 CN414 CN415 CN416 CN417 CN418 CN419 CN420

TEST K0 K1 K2 K3

S402 S403 S404 S405

SET + – AF

ATT2 ATT1 ATT0 AFM ID2 ID1 ID0 BAT3 BAT1 ALO DATA CLK LD LE VCOM RFM GND 32K 4MHZ

SECTION 6
SPARE PARTS

PARTS ORDERING INFORMATION

Standardization of Parts

Repair parts supplied from sony Parts Center may not be always indentical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

Stock of Parts

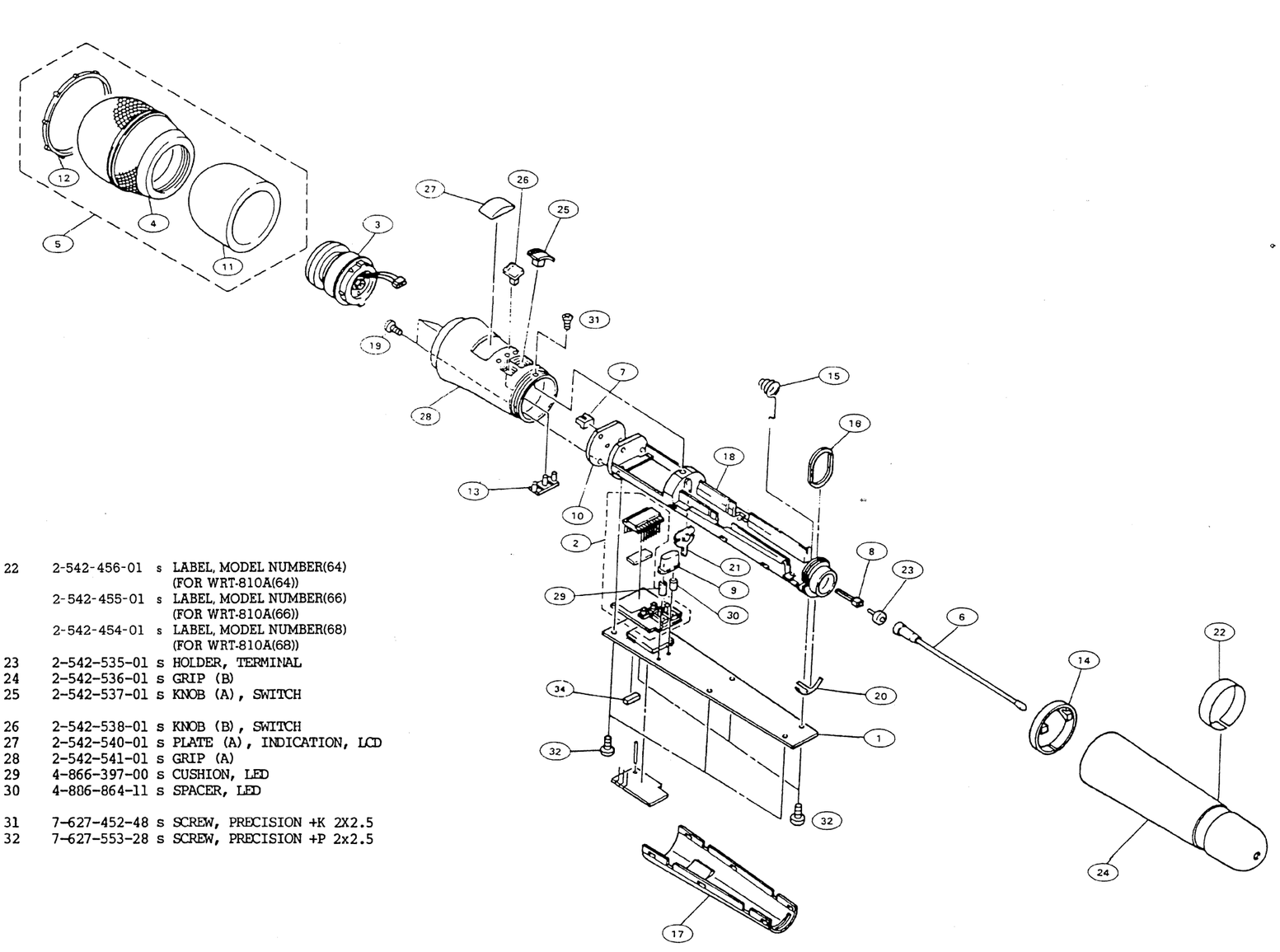
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work.
Orders for parts marked with "o" will be processed, but allow for additional delivery time.

Units for Capacitors, Inductors and Resistors

The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors : μF
Inductors : μF
Resistors : Ω

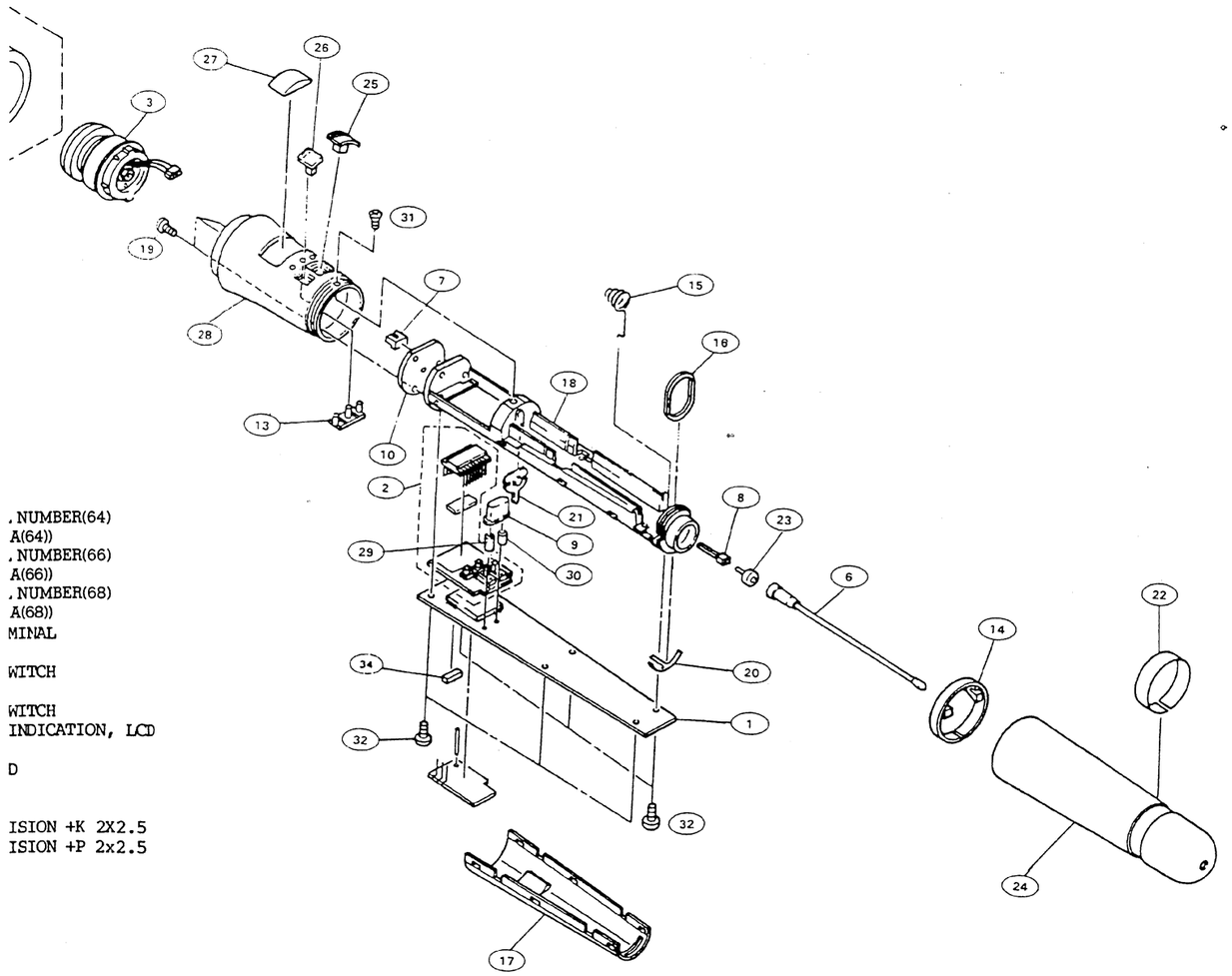
6-1. EXPODED VIEW AND PARTS LIST



Index No.	Part No.	SP	Description
1	A-4538-107-A	o	MOUNTED PCB, SBX1608(64) (FOR WRT-810A(64))
	A-4538-106-A	o	MOUNTED PCB, SBX1608(66) (FOR WRT-810A(66))
	A-4538-105-A	o	MOUNTED PCB, SBX1608(68) (FOR WRT-810A(68)
2	A-4538-104-A	o	MOUNTED PCB, SBX1629-20
3	A-4539-073-A	s	MOUNTED C. BOARD, DM UNIT
4	X-2542-037-1	o	CAGE ASSY
5	A 4539-089-A	s	WINDSCREEN ASSY
6	1-501-509-11	s	ANTENNA
7	1-506-468-11	s	CONNECTOR 3P
8	1-569-218-11	s	CONNECTOR, SIL 1P
9	1-579-382-11	s	VIBLATOR, CRYSTAL
10	1-632-441-11	o	PC BOARD, EX-249
11	2-540-911-01	s	FORM, SCREEN
12	2-540-912-01	s	BELT, CUSHION
13	2-540-916-02	s	PIN, PUSH
14	2-540-917-01	s	RING, RETAINING
15	2-540-921-02	s	SPRING (COIL)
16	2-540-922-01	s	RUBBER, STOP
17	2-540-933-01	o	COVER, FRAME
18	2-540-937-04	o	FRAME
19	2-540-969-11	s	SCREW (M2x5), LR
20	2-540-987-01	s	PLATE, GROUND
21	2-540-996-01	s	TERMINAL BOARD, PLUS
22	2-542-456-01	s	LABEL, MODEL NUMBER(64) (FOR WRT-810A(64))
	2-542-455-01	s	LABEL, MODEL NUMBER(66) (FOR WRT-810A(66))
	2-542-454-01	s	LABEL, MODEL NUMBER(68) (FOR WRT-810A(68))
23	2-542-535-01	s	HOLDER, TERMINAL
24	2-542-536-01	s	GRIP (B)
25	2-542-537-01	s	KNOB (A), SWITCH
26	2-542-538-01	s	KNOB (B), SWITCH
27	2-542-540-01	s	PLATE (A), INDICATION, LCD
28	2-542-541-01	s	GRIP (A)
29	4-866-397-00	s	CUSHION, LED
30	4-886-864-11	s	SPACER, LED
31	7-627-452-48	s	SCREW, PRECISION +K 2X2.5
32	7-627-553-28	s	SCREW, PRECISION +P 2x2.5

6-2. ELECTRIC

Ref. No.	Part No.
SBX1608	
-	A-4538-105-
	A-4538-106-
	A-4538-107-
(These assemblies inclu	
CP301	1-579-376-1
	1-579-377-1
	1-579-378-1
CP302	1-808-882-1
CP303	1-550-771-1
	1-550-517-1
-	3-885-325-0
-	9-911-839-9
-	8-741-608-4
	8-741-608-3
	8-741-608-2
(These ICs include the f	
C101	1-135-149-2
C104	1-162-975-1
C105	1-162-975-1
C106	1-162-970-1
C107	1-162-966-1
C108	1-162-979-1
C110	1-135-149-2
C111	1-162-964-1
C201	1-135-149-2
C202	1-135-157-2
C203	1-135-149-2
C204	1-135-157-2
C205	1-162-970-1
C206	1-162-970-1
C207	1-162-970-1
C208	1-162-970-1
C301	1-162-970-1
C302	1-162-922-1
C303	1-162-910-1
C304	1-162-964-1
C305	1-162-970-1
C306	1-135-162-2
C307	1-164-227-1
C308	1-162-970-1
C309	1-135-157-2
C310	1-162-927-1
C311	1-162-964-1
C314	1-162-964-1
C316	1-162-970-1
C317	1-135-157-2
C318	1-164-004-1
C319	1-162-970-1
C321	1-162-970-1
C501	1-127-552-1
C502	1-127-552-1



. NUMBER(64)
A(64))
. NUMBER(66)
A(66))
. NUMBER(68)
A(68))
MINAL

WITCH

WITCH
INDICATION, LCD

D

ISION +K 2X2.5
ISION +P 2x2.5

6-2. ELECTRICAL PARTS LIST

Ref. No.	Part No.	SP	Description			
SBX1608						
-	A-4538-105-A	o	MOUNTED PCB, SBX1608(68)			
	A-4538-106-A	o	MOUNTED PCB, SBX1608(66)			
	A-4538-107-A	o	MOUNTED PCB, SBX1608(64)			
(These assemblies include the following parts.)						
CP301	1-579-376-11	s	OSCILLATOR, VOLTAGE CONTROL (FOR WRT-810A(64))			
	1-579-377-11	s	OSCILLATOR, VOLTAGE CONTROL (FOR WRT-810A(66))			
	1-579-378-11	s	OSCILLATOR, VOLTAGE CONTROL (FOR WRT-810(68))			
CP302	1-808-882-11	s	HIC KPA-808B (RF MODULATOR)			
CP303	1-550-771-11	s	ISOLATOR (FOR WRT-810A(64),(66))			
	1-550-517-11	s	ISOLATOR (FOR WRT-810A(68))			
-	3-885-325-01	s	SHEET (B), ADHESIVE			
-	9-911-839-99	s	CUSHION			
-	8-741-608-40	s	IC SBX1608-40(FOR WRT-810A(64))			
	8-741-608-30	s	IC SBX1608-30(FOR WRT-810A(66))			
	8-741-608-20	s	IC SBX1608-20(FOR WRT-810A(68))			
(These ICs include the following parts.)						
C101	1-135-149-21	s	TANTALUM, CHIP	2.2	10%	10V
C104	1-162-975-11	s	CERAMIC, CHIP	24PF	5%	50V
C105	1-162-975-11	s	CERAMIC, CHIP	24PF	5%	50V
C106	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C107	1-162-966-11	s	CERAMIC, CHIP	2200PF	10%	50V
C108	1-162-979-11	s	CERAMIC, CHIP	2700PF	10%	50V
C110	1-135-149-21	s	TANTALUM, CHIP	2.2	10%	10V
C111	1-162-964-11	s	CERAMIC, CHIP	1000PF	10%	50V
C201	1-135-149-21	s	TANTALUM, CHIP	2.2	10%	10V
C202	1-135-157-21	s	TANTALUM, CHIP	10	10%	6.3V
C203	1-135-149-21	s	TANTALUM, CHIP	2.2	10%	10V
C204	1-135-157-21	s	TANTALUM, CHIP	10	10%	6.3V
C205	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C206	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C207	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C208	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C301	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C302	1-162-922-11	s	CERAMIC, CHIP	39PF	5%	50V
C303	1-162-910-11	s	CERAMIC, CHIP	5PF	5%	50V
C304	1-162-964-11	s	CERAMIC, CHIP	1000PF	10%	50V
C305	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C306	1-135-162-21	s	TANTALUM, CHIP	33	20%	6.3V
C307	1-164-227-11	s	CERAMIC, CHIP	22000PF	10%	25V
C308	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C309	1-135-157-21	s	TANTALUM, CHIP	10	10%	6.3V
C310	1-162-927-11	s	CERAMIC, CHIP	100PF	5%	50V
C311	1-162-964-11	s	CERAMIC, CHIP	1000PF	10%	50V
C314	1-162-964-11	s	CERAMIC, CHIP	1000PF	10%	50V
C316	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C317	1-135-157-21	s	TANTALUM, CHIP	10	10%	6.3V
C318	1-164-004-11	s	CERAMIC, CHIP	0.1	10%	25V
C319	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C321	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C501	1-127-552-11	s	ELECT	6.8	20%	6.3V
C502	1-127-552-11	s	ELECT	6.8	20%	6.3V

Ref. No.	Part No.	SP	Description			
C503	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C504	1-162-964-11	s	CERAMIC, CHIP	1000PF	10%	50V
C505	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
C506	1-162-962-11	s	CERAMIC, CHIP	470PF	10%	50V
C507	1-135-149-21	s	TANTALUM, CHIP	2.2	10%	10V
C508	1-642-227-11	s	CERAMIC, CHIP	22000PF	10%	25V
C509	1-162-960-11	s	CERAMIC, CHIP	220PF	10%	50V
C510	1-127-559-11	s	ELECT	15	20%	6.3V
C511	1-127-559-11	s	ELECT	15	20%	6.3V
C512	1-127-559-11	s	ELECT	15	20%	6.3V
C513	1-127-559-11	s	ELECT	15	20%	6.3V
C514	1-127-559-11	s	ELECT	15	20%	6.3V
C515	1-127-559-11	s	ELECT	15	20%	6.3V
C516	1-162-970-11	s	CERAMIC, CHIP	10000PF	10%	25V
CN302	1-568-613-11	s	SIL SOCKET 2P			
CV301	1-141-322-11	s	TRIMMER, CHIP			
D201	8-719-941-23	s	DIODE DA204U			
D501	8-719-941-04	s	DIODE SB007-03CP			
IC101	8-759-106-21	s	IC UPD4051BG			
IC102	8-859-106-26	s	IC UPD4069UBG			
IC103	8-759-030-74	s	IC SC14S66F			
IC103	8-759-030-74	s	IC SC14S66F			
IC201	8-759-054-04	s	IC TMP47C446AF-1191(FOR WRT-810A(64))			
	8-759-054-03	s	IC TMP47C446AF-1195(FOR WRT-810A(66))			
	8-759-246-49	s	IC TMP47C446AF-1961(FOR WRT-810A(68))			
IC202	8-759-937-56	s	IC S-8054ALB-LM-S			
IC203	8-759-748-65	s	IC BR93C46F			
IC204	8-759-710-88	s	IC NJM431U			
IC301	8-759-991-83	s	IC MB501SL			
IC302	8-759-710-82	s	IC NJM2406F			
IC501	8-759-982-61	s	IC FA7616N			
L101	1-410-997-31	s	INDUCTOR, CHIP	2.2uH		
L301	1-412-030-11	s	INDUCTOR, CHIP	22uF		
L501	1-424-273-11	s	COIL, CHOKE	10uH		
L502	1-424-274-11	s	COIL, CHOKE	50uH		
L503	1-412-030-11	s	INDUCTOR, CHIP	22uH		
L504	1-412-030-11	s	INDUCTOR, CHIP	22uH		
Q301	8-729-230-60	s	TRANSISTOR 2SA1586-YG			
Q302	8-729-230-63	s	TRANSISTOR 2SC4116-YG			
Q303	8-729-230-60	s	TRANSISTOR 2SA1586-YG			
Q304	8-729-230-60	s	TRANSISTOR 2SA1586-YG			
Q501	8-729-230-60	s	TRANSISTOR 2SA1586-YG			
Q502	8-729-230-63	s	TRANSISTOR 2SC4116-YG			
Q503	8-729-821-15	s	TRANSISTOR 2SD1620			
R101	1-216-837-11	s	CHIP	22K	5%	1/16W
R102	1-216-827-11	s	CHIP	3.3K	5%	1/16W
R103	1-216-825-11	s	CHIP	2.2K	5%	1/16W
R104	1-216-823-11	s	CHIP	1.5K	5%	1/16W
R105	1-216-822-11	s	CHIP	1.2K	5%	1/16W
R106	1-216-820-11	s	CHIP	820	5%	1/16W
R107	1-216-818-11	s	CHIP	560	5%	1/16W

Ref. No.	Part No.	SP	Description		
R108	1-216-816-11	s	CHIP	390	5% 1/16W
R109	1-216-821-11	s	CHIP	1K	5% 1/16W
R110	1-216-838-11	s	CHIP	27K	5% 1/16W
R111	1-216-839-11	s	CHIP	33K	5% 1/16W
R112	1-216-843-11	s	CHIP	68K	5% 1/16W
R113	1-216-832-11	s	CHIP	8.2K	5% 1/16W
R114	1-216-831-11	s	CHIP	6.8K	5% 1/16W
R115	1-216-831-11	s	CHIP	6.8K	5% 1/16W
R116	1-216-831-11	s	CHIP	6.8K	5% 1/16W
R117	1-216-832-11	s	CHIP	8.2K	5% 1/16W
R122	1-216-294-00	s	CHIP	10M	5% 1/8W
R123	1-216-853-11	s	CHIP	470K	5% 1/16W
R125	1-216-841-11	s	CHIP	47K	5% 1/16W
R126	1-216-849-11	s	CHIP	220K	5% 1/16W
R127	1-216-841-11	s	CHIP	47K	5% 1/16W
R129	1-216-833-11	s	CHIP	10K	5% 1/16W
R130	1-216-833-11	s	CHIP	10K	5% 1/16W
R131	1-216-292-11	s	CHIP	20K	5% 1/16W
R132	1-216-292-11	s	CHIP	20K	5% 1/16W
R133	1-216-292-11	s	CHIP	20K	5% 1/16W
R134	1-216-292-11	s	CHIP	20K	5% 1/16W
R201	1-216-841-11	s	CHIP	47K	5% 1/16W
R202	1-216-817-11	s	CHIP	470	5% 1/16W
R203	1-216-841-11	s	CHIP	47K	5% 1/16W
R204	1-216-691-11	s	METAL, CHIP	47K	0.5% 1/10W
R205	1-216-841-11	s	CHIP	47K	5% 1/16W
R206	1-216-833-11	s	CHIP	10K	5% 1/16W
R207	1-216-817-11	s	CHIP	470	5% 1/16W
R208	1-216-841-11	s	CHIP	47K	5% 1/16W
R209	1-216-841-11	s	CHIP	47K	5% 1/16W
R210	1-216-691-11	s	METAL, CHIP	47K	0.5% 1/10W
R211	1-216-677-11	s	METAL, CHIP	12K	0.5% 1/10W
R212	1-212-684-11	s	METAL, CHIP	24K	0.5% 1/10W
R213	1-216-833-11	s	CHIP	10K	5% 1/16W
R214	1-216-833-11	s	CHIP	10K	5% 1/16W
R301	1-216-833-11	s	CHIP	10K	5% 1/16W
R302	1-216-821-11	s	CHIP	1K	5% 1/16W
R303	1-216-457-11	s	CHIP	910	5% 1/16W
R304	1-216-845-11	s	CHIP	100K	5% 1/16W
R305	1-216-829-11	s	CHIP	4.7K	5% 1/16W
R306	1-216-841-11	s	CHIP	47K	5% 1/16W
R307	1-216-841-11	s	CHIP	47K	5% 1/16W
R308	1-216-845-11	s	CHIP	100K	5% 1/16W
R309	1-216-829-11	s	CHIP	4.7K	5% 1/16W
R310	1-216-841-11	s	CHIP	47K	5% 1/16W
R311	1-216-842-11	s	CHIP	56K	5% 1/16W
R312	1-216-845-11	s	CHIP	100K	5% 1/16W
R313	1-216-837-11	s	CHIP	22K	5% 1/16W
R314	1-216-839-11	s	CHIP	33K	5% 1/16W
R315	1-216-851-11	s	CHIP	330K	5% 1/16W
R316	1-216-833-11	s	CHIP	10K	5% 1/16W

Ref. No.	Part No.	SP	Description		
R501	1-216-847-11	s	CHIP	150K	5% 1/16W
R502	1-216-827-11	s	CHIP	3.3K	5% 1/16W
R503	1-216-845-11	s	CHIP	100K	5% 1/16W
R504	1-216-833-11	s	CHIP	10K	5% 1/16W
R505	1-216-835-11	s	CHIP	15K	5% 1/16W
R506	1-216-814-11	s	CHIP	270	5% 1/16W
R507	1-216-839-11	s	CHIP	33K	5% 1/16W
R508	1-216-844-11	s	CHIP	82K	5% 1/16W
R509	1-216-805-11	s	CHIP	47	5% 1/16W
R510	1-216-835-11	s	CHIP	15K	5% 1/16W
R511	1-216-842-11	s	CHIP	56K	5% 1/16W
RV101	1-238-090-11	s	RES, ADJ METAL	10K	
RV501	1-238-089-11	s	RES, ADJ METAL	4.7K	
S301	1-571-275-31	s	SWITCH, SLIDE		
X101	1-567-098-00	s	CRYSTAL		

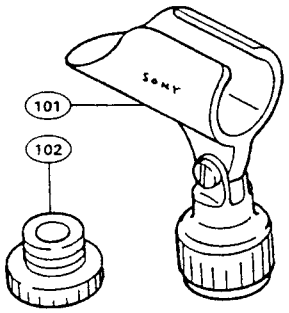
SBX1629-20

-	A-4538-104-A	o	MOUNTED PCB, SBX1629-20		
(This assembly includes the following parts.)					
ND401	1-809-513-11	s	DISPLAY, LIQUID CRYSTAL		
-	8-741-629-20	s	IC SBX1629-20		
(This IC includes the following parts.)					
C401	1-135-157-21	s	TANTALUM, CHIP	10	10% 6.3V
C402	1-135-157-21	s	TANTALUM, CHIP	10	10% 6.3V
C403	1-135-163-21	s	TANTALUM, CHIP	47	10% 4V
C404	1-135-163-21	s	TANTALUM, CHIP	47	10% 4V
C405	1-135-163-21	s	TANTALUM, CHIP	47	10% 4V
Q401	8-729-806-75	s	TRANSISTOR 2SB1120-F		
Q402	8-729-230-63	s	TRANSISTOR 2SC4116-YG		
R401	1-216-835-11	s	CHIP	15K	5% 1/16W
R402	1-216-845-11	s	CHIP	100K	5% 1/16W
R403	1-216-813-11	s	CHIP	220	5% 1/16W
S401	1-570-863-11	s	SWITCH, SLIDE		
S402	1-571-534-11	s	SWITCH, PUSH		
S403	1-571-534-11	s	SWITCH, PUSH		
S404	1-571-534-11	s	SWITCH, PUSH		
S405	1-570-863-11	s	SWITCH, SLIDE		

Ref. No.	Part No.	SP	Description		
SBX1630					
-	8-741-100-96	s	IC SBX1630-01		
(This IC includes the following parts.)					
C601	1-135-161-21	s	TANTALUM, CHIP	22	10% 10V
C602	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C603	1-145-181-21	s	TANTALUM, CHIP	4.7	10% 6.3V
C604	1-163-989-11	s	CERAMIC, CHIP	0.033	10% 25V
C605	1-145-181-21	s	TANTALUM, CHIP	4.7	10% 6.3V
C606	1-162-960-11	s	CERAMIC, CHIP	220PF	10% 50V
C607	1-145-181-21	s	TANTALUM, CHIP	4.7	10% 6.3V
C608	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C609	1-163-809-11	s	CERAMIC, CHIP	0.047	10% 25V
C610	1-162-979-11	s	CERAMIC, CHIP	2700PF	10% 50V
C611	1-162-927-11	s	CERAMIC, CHIP	100PF	5% 50V
C612	1-145-181-21	s	TANTALUM, CHIP	4.7	10% 6.3V
C613	1-162-960-11	s	CERAMIC, CHIP	220PF	10% 50V
C614	1-135-163-21	s	TANTALUM, CHIP	47	10% 4V
C615	1-135-163-21	s	TANTALUM, CHIP	47	10% 4V
C616	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C617	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C618	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C619	1-145-181-21	s	TANTALUM, CHIP	4.7	10% 6.3V
C620	1-162-960-11	s	CERAMIC, CHIP	220PF	10% 50V
C621	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C622	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C623	1-135-177-21	s	TANTALUM, CHIP	1	10% 25V
C624	1-135-149-21	s	TANTALUM, CHIP	2.2	10% 10V
C625	1-164-315-11	s	CERAMIC, CHIP	470PF	10% 50V
C626	1-162-923-11	s	CERAMIC, CHIP	47PF	5% 50V
D601	8-719-941-23	s	DIODE DA204U		
IC601	8-759-141-05	s	IC UPC4574G2		
IC602	8-759-948-26	s	IC NE575D		
IC603	8-759-100-93	s	IC UPC393G2		
Q601	8-729-230-60	s	TRANSISTOR 2SA1586-YG		
R601	1-216-821-11	s	CHIP	1K	5% 1/16W
R602	1-216-823-11	s	CHIP	1.5K	5% 1/16W
R603	1-218-331-11	s	CHIP	51K	5% 1/16W
R604	1-216-842-11	s	CHIP	56K	5% 1/16W
R605	1-218-271-11	s	CHIP	2K	5% 1/16W
R606	1-216-833-11	s	CHIP	10K	5% 1/16W
R607	1-216-834-11	s	CHIP	12K	5% 1/16W
R608	1-216-822-11	s	CHIP	1.2K	5% 1/16W
R609	1-218-271-11	s	CHIP	2K	5% 1/16W
R610	1-216-836-11	s	CHIP	18K	5% 1/16W
R611	1-218-292-11	s	CHIP	20K	5% 1/16W
R612	1-216-830-11	s	CHIP	5.6K	5% 1/16W
R613	1-216-839-11	s	CHIP	33K	5% 1/16W
R614	1-216-839-11	s	CHIP	33K	5% 1/16W
R615	1-216-837-11	s	CHIP	22K	5% 1/16W
R616	1-216-837-11	s	CHIP	22K	5% 1/16W
R617	1-216-833-11	s	CHIP	10K	5% 1/16W
R618	1-216-842-11	s	CHIP	56K	5% 1/16W
R619	1-216-835-11	s	CHIP	15K	5% 1/16W
R620	1-218-296-11	s	CHIP	75K	5% 1/16W
R621	1-216-828-11	s	CHIP	3.9K	5% 1/16W
R622	1-216-835-11	s	CHIP	15K	5% 1/16W
R623	1-216-828-11	s	CHIP	3.9K	5% 1/16W
R624	1-216-855-11	s	CHIP	680K	5% 1/16W
R625	1-216-829-11	s	CHIP	4.7K	5% 1/16W
R626	1-216-845-11	s	CHIP	100K	5% 1/16W
R627	1-216-845-11	s	CHIP	100K	5% 1/16W
R628	1-216-845-11	s	CHIP	100K	5% 1/16W
R629	1-216-833-11	s	CHIP	10K	5% 1/16W
R630	1-216-845-11	s	CHIP	100K	5% 1/16W
R631	1-216-853-11	s	CHIP	470K	5% 1/16W
RV601	1-238-091-11	s	RES, ADJ METAL	22K	

6-3. ACCESSORIES SUPPLIED

Index No.	Part No.	SP	Description
101	A-4508-029-A	o	HOLDER ASSY, MICROPHONE
102	2-100-952-02	s	ADAPTOR, SCREW, STAND (SAD-35)
-	3-750-795-22	s	MANUAL, INSTRUCTION



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